Railway Mechanical Engineer

Founded in 1832 as the American Rail-Road Journal
With which are also incorporated the National Car Builder, American Engineer and Railroad Journal, and Railway Master Mechanic. Name Registered, U. S. Patent Office

February, 1932

Volume 106 *No. 2*

Published on the first Thursday of every month by the

Simmons-Boardman Publishing Company

34 Crystal Street, East Stroudsburg, Pa. Editorial and Executive Offices,

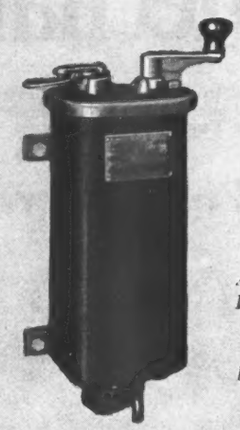
30 Church Street, New York

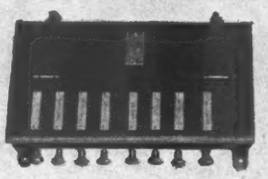
Chicago: 105 West Adams St.
Washington: 17th and H Streets, N. W
Cleveland: Terminal Tower
San Francisco: 215 Market St

Subscriptions, including the eight daily editions of the Railway Age published in June, in connection with the biennial convention of the American Railway Association, Mechanical Division, payable in advance and postage free: United States. and Mexico, $3.00 a year; Canada, $3.50 a year, including duty; foreign countries, not including daily editions of the Railway Age, $4.00.

The Railway Mechanical Engineer is a member of the Associated Business Papers (A. B. P.) and the Audit Bureau of Circulations (A. B. C.) and is indexed by the Industrial Arts Index and also by the Engineering Index Service.

Gas-electric Rail-car Control





Above, auxiliary-circuit switch, Type BS, with buttons for engine starting, headlights, exciter field, etc.

Left, controller for traction motors, either Type PCL or Type K

Part of a Complete G-E Equipment

G-E control for rail cars includes the switches, contactors, and cable necessary to control and regulate the electric power transmitted from the generator to the traction motors. To meet every requirement of maintenance and operation, two kinds of control are available—direct and remote. And like all other parts of G-E rail-car equipment, G-E control has proved its value in the service of railroads throughout the United States and in foreign countries. That is why a large majority of the gas-electric rail-cars in service are G-E equipped. General Electric Company, Schenectady, N. Y.

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391-46

GENERAL ELECTRIC

RAILROAD EQUIPMENT

Railway
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Milwaukee Progressive Flue Repair Shop

Tube or flue receiving rack

The operations are organized for progressive movement without back travel—Both power and gravity movements reduce manual handling to a minimum—Scale is removed by passing the flues through cracking rolls and the cleaning finished by sandblasting

BOTH locomotive and car maintenance work, particularly heavy repairs, on the Chicago, Milwaukee, St. Paul & Pacific have been concentrated largely at the main repair shops, Milwaukee, Wis. This is especially true with respect to heavy boiler repairs, including the application of safe ends and general maintenance of boiler tubes and superheater flues. A thoroughly-revised and modern flue shop was completed early in 1930, one of the unusual features being the provision of cracking rolls and sandblast equipment for cleaning tubes and flues. Dual friction cut-off saws and an electric flue-welding machine were installed, and the entire machinery and equipment arranged for the progressive movement of flues through the various repair operations without back travel and with a minimum expenditure of manual labor.

The fundamental soundness of the Milwaukee flue-shop layout has been amply demonstrated in about two years of operation, during which the cost of repairs, including charges for labor, material and shop overhead, has been reduced to an average of about 2½ cents a foot for small tubes and 9 cents a foot for superheater flues. With an average force of three boiler makers and five helpers, working 40 hours a week, an output of about 6,000 to 6,500 tubes, plus 150 to 350 superheater flues, can be obtained.

The Milwaukee flue-shop machinery layout is shown in the large drawing, important units in the repair

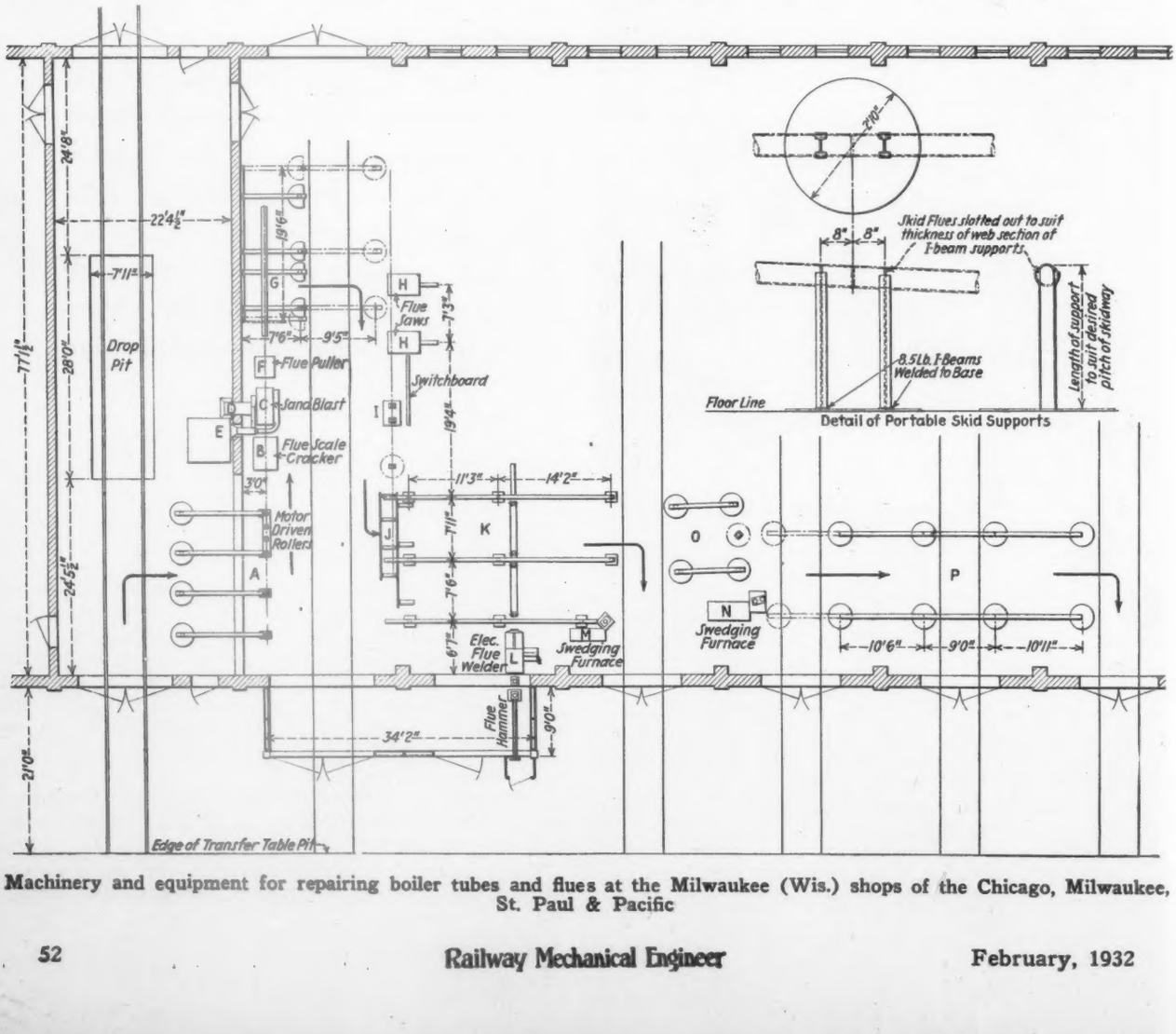
equipment being indicated by letters and the general movement of tubes and flues by arrows. A detailed record of the machines installed, individual power requirements and manufacturers' names, is given in a table elsewhere in this article. Tubes and flues are received from the erecting shop or from the stores department, as the case may be, in one bay of the boilershop building, separated from the flue shop proper by a brick firewall. Tubes received from the erecting shop are usually loaded on push cars and moved to the boiler shop via the transfer table. Tubes received from other points on the Milwaukee for repairs are handled on Blue Bird three-wheel trailers of rugged design. In either case, an entire set of tubes is lifted by means of a steel-cable sling and Elwell-Parker crane truck to the receiving rack *A*. This is an inclined rack or skidway of substantial construction, made of steel I-beams and scrap superheater flues, welded together to form a rigid unit, supported on circular steel floor plates of generous size.

The tubes pass through a narrow opening into the flue shop, where they are tripped one at a time into the cleaning line and delivered by motor-driven rollers to the Ryerson flue scale cracker *B*. The three power-driven, knurled cracking rolls, adjustable by an eccentric to accommodate any size from 2-in. to 5½-in. tubing, are set at an angle, and serve not only to crack off the dry scale but to propel 2-in. tubes into the sandblast machine *C* at a rate of 18 ft. per minute and 5½-in. flues at a rate of 9 ft. per minute.

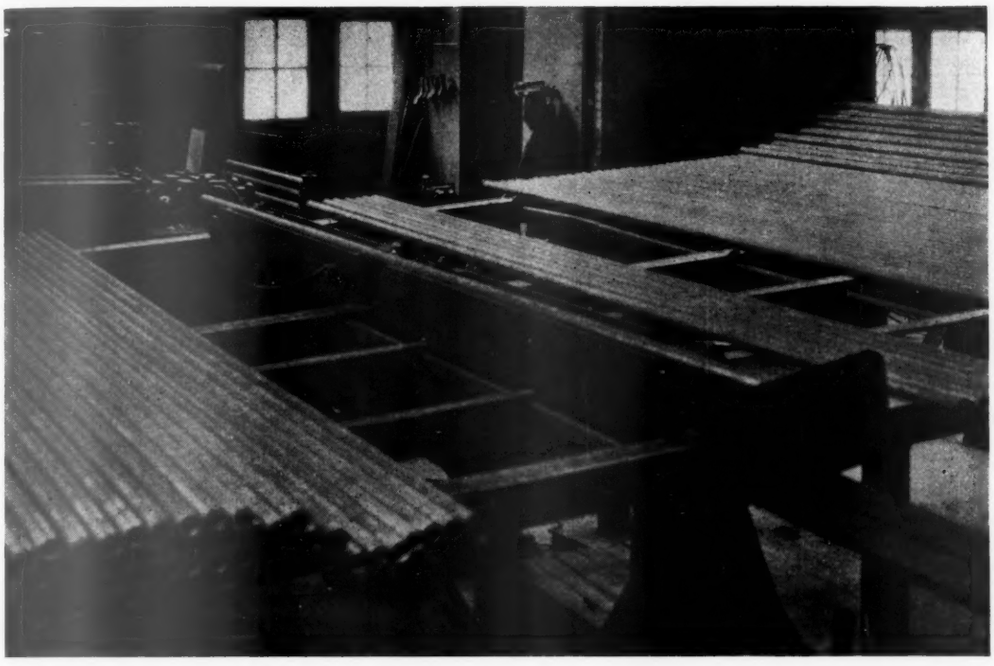
The sandblast machine is equipped with seven easily-replaceable cast-iron nozzles, through which dry silica sand, drawn from the bottom of the machine by suction, is discharged directly on top of the revolving tube or flue. Air for this operation is taken from the shop air-line at a pressure of about 90 lb. per sq. in. Motor-driven fan *D* draws air, fine dust and scale from the machine, delivering it to the New Haven dust arrester *E*. In this large dust arrester, baffles serve to release the dust from the air, permitting it to drop to the bottom of the arrester where it is drawn off through a small hopper slide opening into a lift-truck skid for easy removal. The seven sandblast nozzles are evenly spaced on about 6-in. centers, along the section of tube or flue which is in the sandblast machine. While in some cases the nozzles have only a short life, they are relatively inexpensive to replace. The sand is used over and over again until its cutting qualities are practically lost, at which time it passes to the dust arrester in the form of a fine powdery material. Approximately one cubic

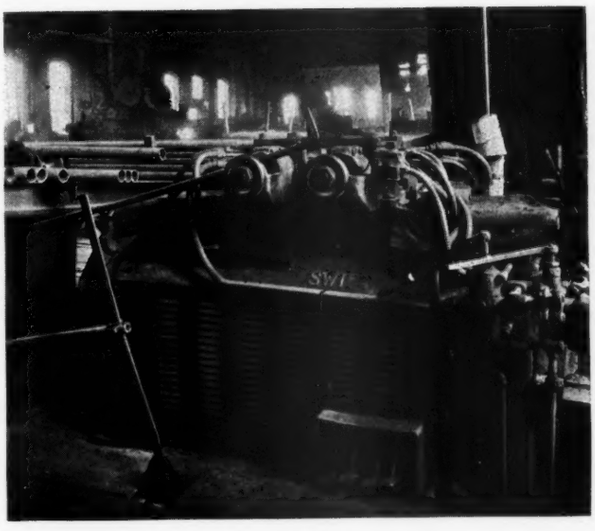
List of Flue-Shop Machinery and Equipment

Kind of machine	Size of motor	Manufacturer
No. 13 fan blower.....	5 hp.	Clarage Fan Company, Kalamazoo, Mich.
Universal scale remover	5 hp.	Joseph T. Ryerson & Son, Inc., Chicago
Universal sandblaster..	.....	New Haven Sand Blast Company, New Haven, Conn.
Flue puller	3 hp.	New Haven Sand Blast Company, New Haven, Conn.
Dust arrester	.....	New Haven Sand Blast Company, New Haven, Conn.
Two friction saws....	10 hp.	Joseph T. Ryerson & Son, Inc., Chicago
No. 35 electric welder..	.....	Swift Electric Welder Company, Detroit, Mich.
Two swedging furnaces	.....	Shop made
Three flue hammers...	.....	Joseph T. Ryerson & Son, Inc., Chicago



Machinery and equipment for repairing boiler tubes and flues at the Milwaukee (Wis.) shops of the Chicago, Milwaukee, St. Paul & Pacific





For handling tubes to the electric-welding machine a skidway and air-operator device are used to save labor. Below is the Swift electric flue welder showing operating and control levers

yard of new sand is used for replacement each day under normal operation.

As the boiler tube or flue passes through the sandblast machine, it is engaged by the three rolls of the flue puller *F*, only one of these rolls being power-driven. The puller rolls are set to move the tube or flue at the same speed as that given by the cracker. Passing through the flue puller, the forward end of the tube or flue engages a carrier which moves along an inclined I-beam rigidly supported from the flue-shop wall. When this carrier reaches the end of its stroke, a trip is operated which permits the tube or flue to drop to the skidway *G*. This skidway is constructed of straight lengths of scrap superheater flues slotted at one end to engage a Z-bar bolted to the wall and at the other end resting on short upright sections of flues welded to movable floor plates. It is obvious that this construction permits moving the inclined straight lengths of flues constituting the skidway to any point desired along the Z-bar, so as to accommodate tubes and flues of varying lengths.

Flue Handling to the Cut-Off Saws

From skidway *G*, the tubes or flues roll by gravity onto temporary superheater-flue extensions across the track, ready for handling into the cut-off saws. It is here that the initial inspection of the tubes or flues takes place. As they are rolled across the track, before passing to the cut-off saws, they are examined, any observed to be thin or excessively pitted or corroded being rejected and placed on a trailer for delivery to the scrap dock. Those suitable for reclamation are passed on to the two Ryerson friction saws *HH*, one of which is stationary and the other adjustable, to permit cutting the tubes and flues to the correct length, both ends being cut simultaneously. These cut-off saws are of the hobbed-tooth friction type, water-cooled and operated at 3,600 r.p.m., each by a 10-hp. motor.

After being cut to length, each tube or flue is lifted slightly from its supports by an air-operated unit equipped with power rolls which give the tube or flue an impulse over intermediate rolls *I* to roller-equipped table *J*, from which it rolls by gravity to a portable rack or sling, subsequently elevated by a crane truck onto the upper end of skidway *K*. The details of this skidway, as well as the air-operated unit for delivering flues to the electric welder, are clearly shown in detail on another drawing. Inverted inclined rails are welded to vertical supports of the required length made of scrap flues. A flue carrier, equipped with power rolls driven from a reversible air motor, is provided with an air cylinder arrangement to elevate each tube or flue, as it is tripped, and propel it into the electric welding machine, where it is stopped by the safe end previously gripped in the dies. After being welded, operation of the power rolls moves the tube or flue through the dies and into the required position under the flue hammer where the weld is reduced to the proper dimensions.

Flues Roll by Gravity into Swedging Furnace

After hammering of the weld, the tube or flue is returned by the reversible rolls to skidway *K* and rolled by gravity into the swedging furnace *M*. This furnace is of the open-side type, 18 in. wide by 4 ft. 6 in. long,

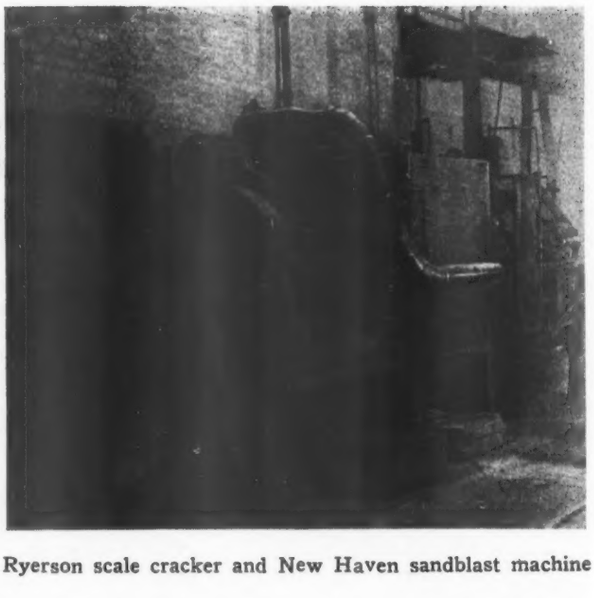
which permits the gradual heating of the tubes until they are removed, one at a time, from the hottest end of the furnace for the swedging operation under the hammer. After swedging, the tubes are loaded on a push car and, if not pitted, are ready to be blown out and delivered to the erecting shop or stores department through the adjacent shop doorway. If pitted, they are moved to storage rack *P* for final inspection, welding of pitted spots by the acetylene torch, etc. Superheater flues are rolled across a portable skidway to position *O*, where they are swedged in furnace *M* of similar design to *N*, but large enough to accommodate the larger flues. The superheater flues, also, are elevated to storage rack *P* where any pitted spots are filled in by welding. After all repair operations are completed, either tubes or flues are blown out and are then ready for delivery in complete sets through the nearest flue-shop door to the erecting shop, or to the storehouse. No tubes or flues are tested subsequent to reclamation, as experience has shown less than 1 per cent of failures after application in the boilers.

The Operating Force

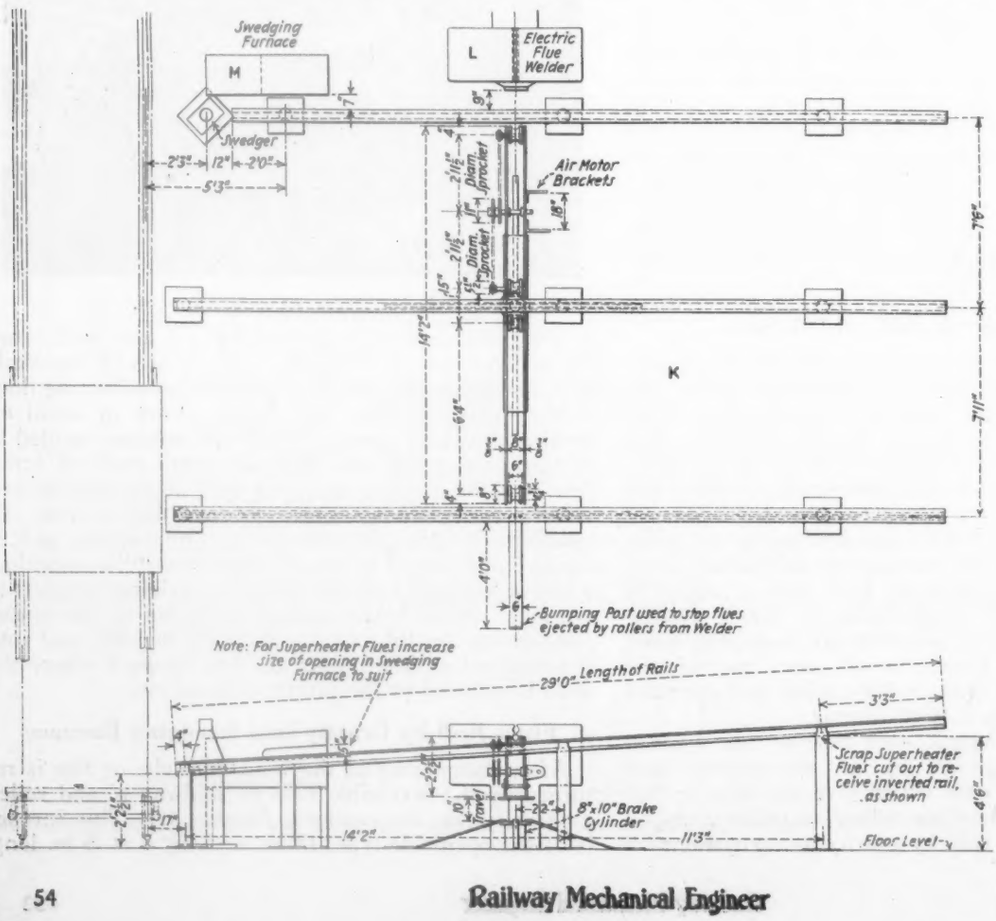
Under normal conditions, two helpers operate the entire line of flue-cleaning equipment, one on the day shift and one at night, in order to keep up with this part of the work. One man operates the friction saws, with a helper when handling superheater flues. One man operates the electric welding machine and flue hammer, and another the swedging furnace *M*. The latter, when swedging large superheater flues in furnace *N*, has an additional helper to assist in revolving the flues. One or more welders, as required, are used in filling in pitted holes with the oxyacetylene welding torch. Therefore, when the flue shop is running at what might be called normal capacity, a force of three boiler makers, five helpers and one or two acetylene welding operators, depending upon the severity of the pitting condition, is employed.

The only part of the flue-shop operating on more than one shift is the cleaning line which must usually be operated one extra shift in order to keep up with the other part of the work. Whereas the capacity of the cleaning line is at the most about 60 two-inch tubes an hour, the friction saws have at least twice that capacity and the electric welding machine can apply safe ends 18 in. long or less to 2-in. tubes at the rate of 80 to 86 an hour. The swedger has a capacity of about 150 two-inch tubes an hour.

(Concluded on page 58)



Ryerson scale cracker and New Haven sandblast machine



General arrangement of device for handling tubes and flues to the electric welder

Railroad-Car Lubrication Tests

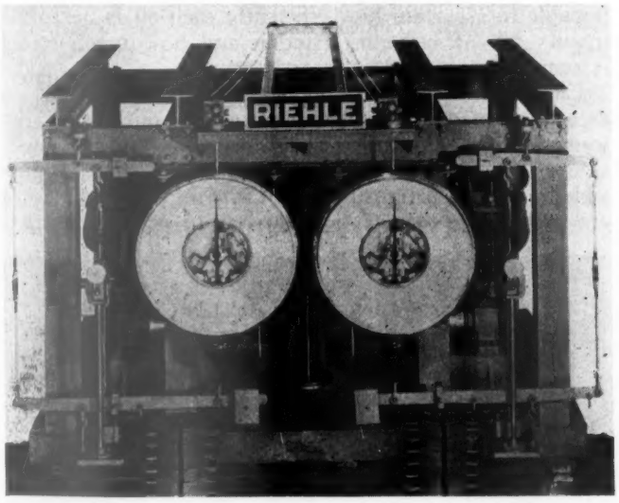
Standard Oil Company of New Jersey is conducting series of tests with an especially constructed machine—Tests being run under wide range of temperatures

THE Standard Oil Development Company has had built to its specifications a railroad car-journal oil-testing machine which is now installed at its research laboratories, Bayway, N. J. The testing apparatus was constructed by Riehle Brothers, Philadelphia, Pa., and is believed to be the only machine of its kind designed to measure oils qualitatively. The tests, which have been under way since November, 1931, were instigated by the Standard Oil Company of New Jersey with the definite objective of giving the subject of railroad journal lubrication the same thorough, scientific study that automotive lubricants are receiving.

In general, the Bayway laboratory staff is seeking the answers to three different questions through a series of exhaustive tests with the machine:

A—Many railroad cars, particularly those on a north and south route, experience a wide range of temperatures during a single trip. Just how effective are the various car lubricating oils under such operating conditions?

B—What is the film strength of different oils under varying imposed journal loads and what is the effect of viscosity on the tendency for waste grab?



Front view of the oil-testing machine at Bayway

C—What is the effect of quick brake application on car oils with the resulting tendency of journal-bearing brasses to become distorted on the axle journal?

The Standard Oil Development Company's research program calls first for the testing of oils now on the market, followed by a series of tests with special lubricating oils developed from the knowledge gained in the preliminary investigations.

The Testing Machine

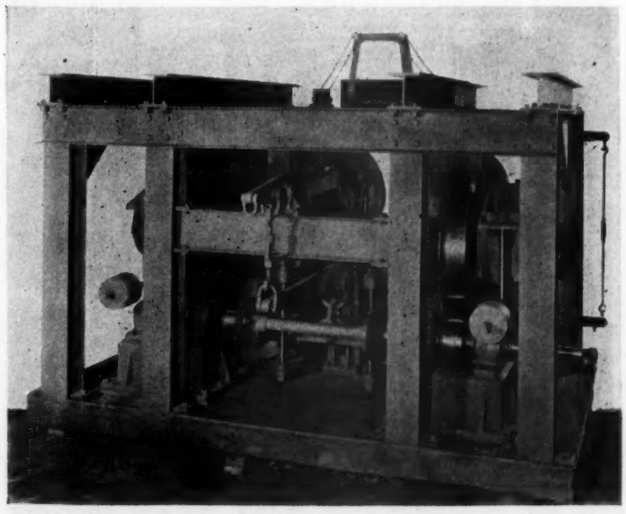
The preliminary design of the testing machine was evolved after considerable study of previous apparatus designed to accomplish similar results and with the collaboration of a number of railroad lubrication engineers. These efforts resulted in the final design of testing machine which is now installed in an insulated room in the research laboratories at Bayway.

A pair of standard car wheels mounted on 5½-in. by 10-in. journals are placed in the machine as shown in the illustrations. Each wheel is supported on two steel rollers, 10 in. in diameter and having a 4-in. tread. Both sets of rollers are driven by a single shaft connected through a flexible coupling to a 200 hp., 3,500 r.p.m. General Electric cradled-type electric dynamometer. One roller of each pair is power driven. To aid in the simulation of freight-train starting conditions, the dynamometer is arranged with an especially high starting torque. It can be driven at speeds ranging from one to 90 m.p.h.

The effect of rushing air is simulated by means of electrically driven blowers which force a current of air through ducts direct against the side of the journal boxes. The force of the air can be regulated from a five-mile-an-hour breeze to a 40-mile gale.

A suitable framework has been provided for the future mounting of a braking rigging. Braking tests are contemplated to ascertain the effect of the tendency for journal bearings to ride forward on the journal and skew sideways with the momentum of the car. In addition to studying the effect of brake action on bearing distortion, it is planned to study the cause and effect of waste grabs and to determine the extent to which hot boxes tend to develop under such conditions.

The amount of load carried on the car journals is adjusted by means of a lever and weight arrangement shown in the illustration. The load on the bearings and journals can be increased from zero to a maximum of 25,000 lb. per car journal.

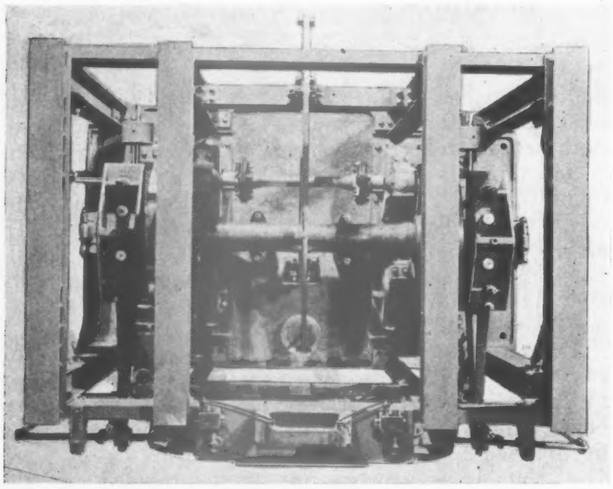


Rear view showing the rollers and flexible shaft

The testing machine is mounted in a constant-temperature control room, about 10 ft. by 14 ft. and 8 ft. high. The room is completely insulated, 13 in. of cork being applied on the floor and 8 in. of cork around the side walls. Direct-expansion refrigerating coils with ammonia refrigerant are located directly above the machine. The temperature of the room can be lowered to 35 deg. F. below zero.

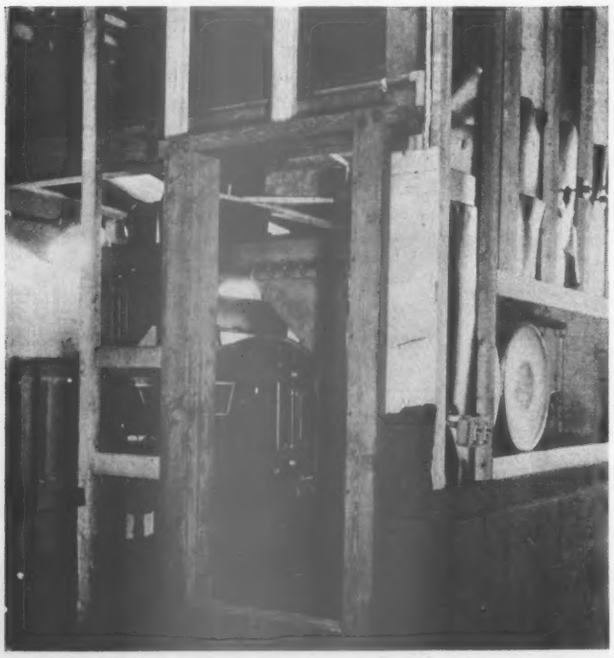
Heating elements are arranged along one side of the room to provide the higher ranges of temperature, which can be raised to 120 deg. F. Auxiliary electric fans are provided to further circulate the heated air in case the motor-driven blowers prove insufficient.

A large observation window is provided in the front

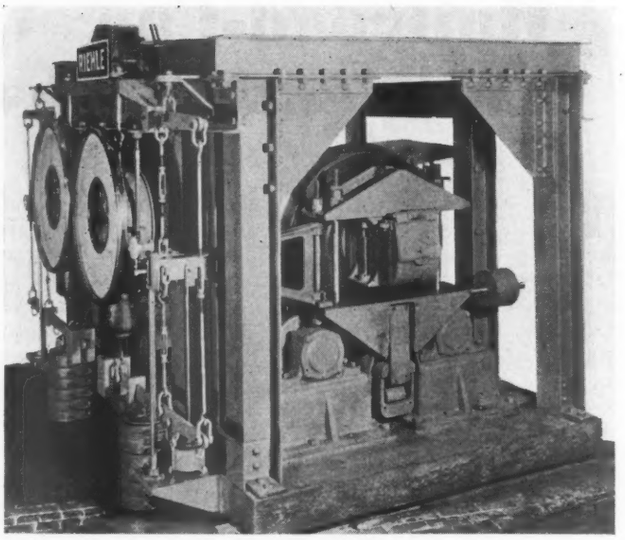


View of the top looking down

of the room. The two large dial scales on the machine are located directly in front of the window, where they can be readily observed from the control station which is located outside the room.



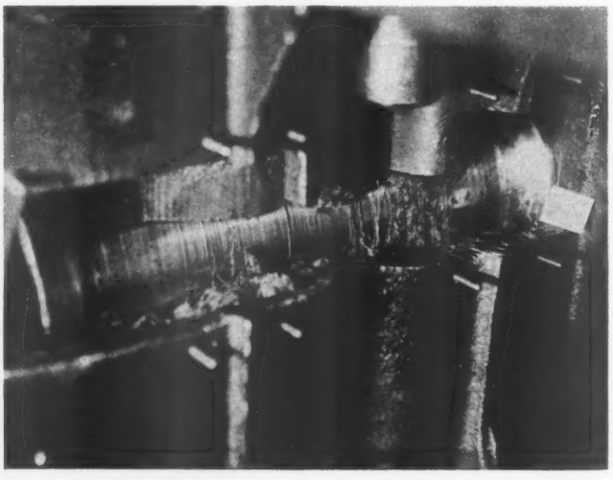
Test room during construction showing the refrigerant coils overhead and the cork insulation



Side view showing the load adjusting arrangement

One dial scale is provided for each journal. By means of suitable levers and linkages each scale shows the frictional torque in pound-feet and the power required at the tread of the wheels to turn the journals under the load. Under a variety of operating conditions it is possible to ascertain how efficiently each oil is performing its job of reducing friction and how much effort is required to do it.

Electro-resistance thermocouples are provided to ascertain room temperature, air at the outside of the journal box, temperature of the waste around the lower side of the journal, and also at a point as close as possible to the bearing surface of the brass. A hole is cut in the side of each journal box to permit observa-



A waste grab which occurred at 10 deg. F. below zero

tion of the journal at the point where the journal meets the brass.

Provision has been made for packing with different grades of cotton and wool waste. The recommended A.R.A. practice of packing journal boxes is followed. All commercially branded oils of summer, winter and extreme winter grades will be tested, together with a number of experimental oils especially compounded for railroad service.

(Continued on page 63)

Union-Management Co-operation on Railroads

GREAT changes have taken place since the World War in the relations between the workers and the managements in industry and on the railroads. The various parties involved gradually have come to a recognition of the fact that in a large way, at least, their interests are mutual. Henry L. Gantt, the management or industrial engineer who passed away in 1919 and who was well and favorably known by some of the railway mechanical department officers by whom he was retained in a consulting capacity, made certain statements in his book, "Organizing for Work," which are today receiving much commendation, even though they were seriously received by only a comparatively small group when the book was published. We find, for instance, the statement that, "The community needs service first, regardless of who gets the profits, because its life depends upon the service it gets." And then again, "The business system has its foundation in service, and, as far as the community is concerned, has no reason for existence except the service it can render."

Naturally the railroads, as public utilities, have a keen appreciation of their responsibility to the public. This means that, as in industry, four factors must receive consideration and their interests must be properly balanced. In addition to the public, this includes the worker, the management, and the owner or investor. If the interests of any one of these elements is overlooked or disregarded, an unstable condition results, which is unhealthy to the body as a whole and may bring about disaster, if not corrected.

1922 and Its Lessons

Things have been very much out of balance in this respect at various times in the past, and this was notably true in the railroad field in the immediate post-war years. Disaster finally resulted in 1922, culminating in the great railroad shop strike. The situation on the railroads, at that time however, was not very different from what it was in the industrial field. Fortunately far-sighted leaders and students had much earlier sensed, at least to a degree, some of the dangers which are involved in the intense mass-production industrial development, which largely had its beginning in the first two decades of the present century. Old ideas about the relationships between the workers, the management, the owner and the public proved to be pitifully inadequate and had to be thoroughly revised to suit the new conditions. As a matter of fact, they never were right, even under the older conditions, but when subjected to the spotlight of intensive industrial development in this country—because of the introduction of mass-production methods—and the steadily rising standards of general intelligence due to modern educational programs and methods, a crisis was precipitated. Quite probably another factor in bringing this about was the general intermixture of our people, because of the calling to the colors during the war of the young men from every nook and corner of the country.

Naturally, during the war and especially immediately after its close, much thought and study were concentrated upon all sorts of relationships and particularly upon the human relations in industry. Undoubtedly the railway shop strike of 1922 had a large effect in speeding up and stimulating the logical corrective processes, many of which had been started early in the century by the small group of management engineers which had gathered around Fred W. Taylor.

The years following 1922 witnessed many evidences of the attempt to improve human relationships on the railroads, and this was particularly true in the mechanical department. It included, among other things, the urge on the part of the executives, supervisors and foremen to improve the standards of supervision, and particularly to stress the importance of the human element. Impetus was given to apprentice training, and the Railroad Y. M. C. A. sponsored many better-relations meetings and also inaugurated a series of Younger Railroad Men's Conferences, with a view to stimulating vocational guidance and helping the younger men to find their proper places in the organization and to study better to fit themselves for their life work. The Railway Age competition for the best articles on co-operation in the interests of more efficient and economical operation attracted widespread attention. Much thought was concentrated upon the effort to stabilize employment, and works councils were introduced on many railroads in the mechanical and other departments, through which the members were encouraged to make suggestions for improving the practices, equipment, facilities and service.

Union-Management Co-operation

Following the railroad shopmen's strike some of the railroads continued to recognize the shop-crafts unions, while in other instances the workers on the individual railroads organized as independent units to deal with their managements. In the latter cases the standard shop rules were discarded and new rules were drawn up to suit the requirements of the individual railroads. Special efforts were made in many instances to induce a strong spirit of co-operation between the workers and the managements.

It was about this time that the union-management plan of co-operation was started on the Baltimore & Ohio, later being extended to the Canadian National and the Chicago & North Western in 1925, and the Chicago, Milwaukee, St. Paul & Pacific in 1926. It is a type of employee representation providing for joint committees of representatives of management and workers for the discussion of problems of mutual concern, including improvements in facilities, equipment, materials, practices and working conditions.

This movement naturally secured much publicity. Claims of all sorts were made for it, but it is, of course, extremely difficult to evaluate the results of a movement of this sort and, moreover, it could hardly be expected to show conclusive results in its earlier stages. Obviously, both this movement and the so-called company union movement with its works councils were stimulated by a certain degree of competition, and all sorts of claims were made for both systems. The union-management system of co-operation has been largely restricted to the mechanical departments of the

roads mentioned, although it has been extended to the transportation department on the Baltimore & Ohio and to the department of maintenance of way and structures on the Baltimore & Ohio and the Canadian National.

Professor Wood's Study

In 1928 Louis Aubrey Wood, associate professor of economics of the University of Oregon, received a Sterling research fellowship in Yale University, and under the direction of the Graduate School of that institution made a study of between 40 and 50 maintenance-of-equipment stations on the railroads operated under the so-called union-management co-operation. In addition, a thorough study was made of all of the data available, and many railroad and labor union officers were interviewed. As a result Professor Wood prepared a comprehensive report, which was published in book form by Yale University Press, New Haven, Conn., in 1931. It is entitled "Union-Management Co-operation on the Railroads" and presents in 326 pages a rather thorough and complete description and study of the union-management co-operative movement on the railroads up to that time, or when it had been in actual operation on the Baltimore & Ohio for about seven years. The book is well written, and while primarily of interest to railroad men, carries sufficient detail about mechanical-department operations so that the general reader who is interested in union-management co-operation can follow it intelligently.

It traces the growth of the movement from its inception and goes thoroughly into the technique of its operation and the attitudes of the men and the management toward it. Much space is given to typical, concrete statements of constructive suggestions which have been made, dealing with repair-point equipment, new construction, shop methods, appliances, materials and betterment of working conditions. Other chapters discuss the resulting improvement in morale, the problems associated with the measurement of co-operative gains, the stabilization of employment, the fair sharing of gains, apprentice training under co-operation, methods of incentive wage payment, and co-operation in other departments than the mechanical. The final chapter deals with the significance of union-management co-operation on the railroads.

Results in General

The author is to be commended for the thoroughness and completeness of the study. There can be no question about the good results that have come from this movement, although Professor Wood in his closing chapter makes this statement: "Even though at this writing union-management co-operation has had an opportunity for seven years to demonstrate its effectiveness on American carriers, it can scarcely be claimed that the time has arrived when anything like a verdict on it may be given. The brief evaluation submitted, of certain mental and material results attributable to the movement, is intended to be merely provisional. Since co-operation of the type existing on American railroads has been shown to be dependent for its success upon the attainment of a right attitude of mind both by administrators and workers, due weight must necessarily be attached to the views of the psychologists in any appraisal of its non-material accomplishments."

In another place Professor Wood states: "The newness of the appeal has applied incentives that have not quickly died down, and because at the outset many industrial adjustments have been found necessary, suggestions have tended to flow into co-operative meetings. But, invariably on roads where the plan has been long enough in effect, a time is reached when interest begins to flag and the list of suggestions gradually diminishes. Faith in co-operation under these circumstances is bound to be subjected to a critical test. **** At the same time, interest in the movement should revive, if both management and workers keep in mind the fact that, even though suggestions grow fewer in number, their regular and thoughtful presentation should still net gains worthy of the effort, and the very essence of co-operative spirit is reflected in day-by-day performance of quality work."

It must, of course, be clearly kept in mind that while these developments in labor union-management co-operation have been taking place on some few railroads, possibly equal or even more important developments have been taking place on other roads in inducing a fine spirit of co-operation on the part of the shop-crafts employees, and on some of these roads this has extended into practically all of the departments, including not only maintenance of way and transportation as under union-management co-operation on the Baltimore & Ohio, but to the clerical and other forces as well. It would be instructive if a study similar to that made by Professor Wood could be made on those railroads which have given the problem of inducing intelligent and cordial co-operation between the managements and the employees special attention under other auspices, and particularly those roads maintaining so-called company unions.

Milwaukee Progressive Flue Repair Shop

(Continued from page 54)

The reclamation of boiler tubes and flues constitutes exceptionally severe service, and all machine bearings must be fully protected from dust and dirt and designed to stand severe vibration. As a result of experience, certain precautions must be observed to secure the best results in cleaning tubes and flues. For example, the scale cracker, while designed to operate efficiently with all kinds and thicknesses of scale, will do this only if the scale is dry. Otherwise, the knurled projections on the wheels become clogged with wet scale in a powdered form and are rendered useless for the purpose intended. Occasionally, even with dry scale, it is not all removed and a set of flues may have to be put through the cracker and sandblast machine twice. All flues must be entered in the scale cracker from the front ends, which are relatively smooth and without burrs, to avoid difficulty in engaging the cracking rolls. Pretty much standard practice is followed in the operation of the friction saws except that in this case they are provided with pneumatic feed to permit one-man operation. Hand feed is also available for use in case of necessity. No special machine or belt sanding of the ends of the flues or of the safe ends is necessary in preparation for the welding operation as the small amount of thin flash left by the friction saws is quickly melted into the weld and subsequently hammered into a uniform smooth surface. The operation of the welding machine is fully safeguarded, with all operating levers and handles conveniently located, and the inherent characteristics of the machine such that it is in general easy to operate at the rate of speed necessary for the best results, from the point of view of maximum production of satisfactory welds.

Teaching Air Brakes

By C. M. Drennan *

A description of the teaching methods used in air-brake instruction by the Kansas State Board for Vocational Education

THE only air-brake school of its kind in the country has completed its third year. It is conducted through the co-operation of the railroad companies, the public schools, the brotherhoods, and the Kansas State Board for Vocational Education.

The only equipment used is a blackboard, chalk, and a few dismantled pistons and valves. The methods used are the result of more than 20 years' experience in teaching air brakes to railroad men. Many methods were tried with more or less success, such as charts, rooms equipped with air-brake apparatus, air-brake instruction cars, sectional equipment, movable charts, stereoptican slides, motion pictures, etc.

The simplest and easiest way to understand the operation and maintenance of air brakes is by the use of a blackboard. Every phase of air-brake valve operation, defects, train handling, maintenance, or repair is demonstrated in complete detail from the simplest dirt collector to the most complicated, such as the universal valve.

The teacher draws a diagram of a small part of the apparatus under discussion. These are easy to follow and are understandable. Questions from the group result naturally as the diagrams are built up.

The course is divided into eight units as follows: Unit 1—Triple valves, air compressors, pump governors, etc.; Unit 2—K triple valves, distributing valve; Unit 3—L triple valves, brake valves; Unit 4—Air-signal system, feed valves, M3A, F3, etc.; Unit 5—Foundation-brake gear, LT locomotive brake, brake-pipe vent valve; Unit 6—Terminal test, brake-pipe leaks, ET equipment; Unit 7—Piston travel, equalization, freight-train handling; Unit 8—Universal-control equipment, passenger-train handling.

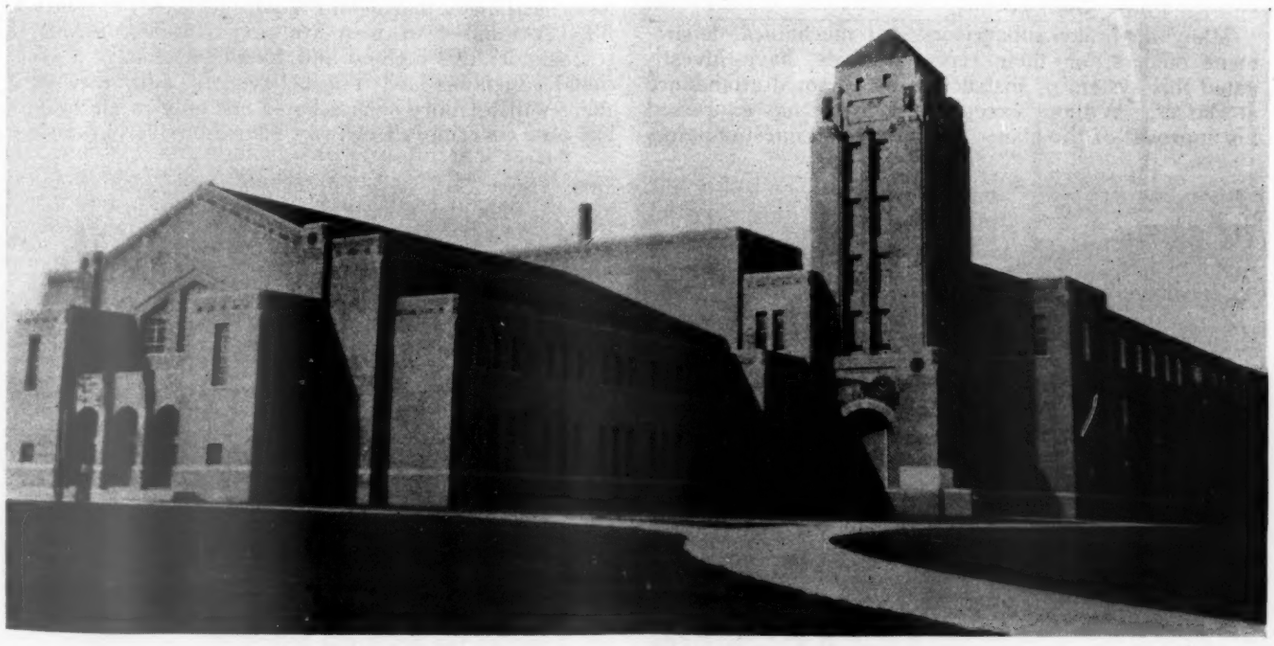
Classes are held as follows: Mondays, Wednesdays, Fridays—2½ hrs.—7 to 9:30 p. m.; Tuesdays, Thursdays, Fridays—2½ hrs.—2 to 4:30 p. m.; every day, except Sunday—2½ hrs.—9 to 11:30 a. m.

Classes Scheduled to Suit the Men

Each unit is given on six occasions extending over a period of three days. Thus, any employee is able to attend a class at least once, no matter what his shift or whether he is on a regular run or in the "chain gang." The first part of each unit is on subjects of interest to all classes of employees, while the last half is planned to be of interest to enginemen and locomotive repairmen. If these classes are attended each year, it gives all employees an opportunity to keep up to date on the things that are difficult for them to learn from books.

It is not contemplated that these classes will teach a fireman so he will be competent to leave the schoolroom and handle a 100-car freight train with no further training. That part of his knowledge must be obtained through his observation as a fireman and by his apprenticeship under his engineman, road foreman and

* The author is employed as an instructor of locomotive engineering by the Kansas State Board for Vocational Education. His headquarters are located in Arkansas City, Kan



New high school in Wichita, Kan., where one of the air-brake schools is held

master mechanic. However, he can be taught the holding power of empty cars compared with loads; what the sudden change in slack means, and what forces, shocks, etc., at different speeds do and the accompanying damage and cost. This can be taught much easier in a classroom than it can by actual experience on the road.

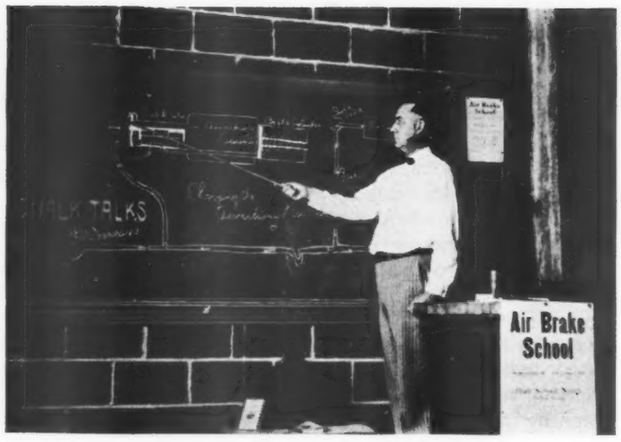
During the past year 1,750 railroad men have voluntarily enrolled in this school and have attended whenever possible. Of this group, 28 per cent are locomotive firemen; 23 per cent, locomotive enginemen; 17.5 per cent, car repairmen and inspectors; 8.3 per cent, yard and trainmen; 7.1 per cent, apprentices; 6.7 per cent, machinists; 5 per cent, supervisors; 3.8 per cent, miscellaneous, and .6 per cent, hostlers.

Vocational Evening Trade Class

The air-brake school is a special type of vocational evening trade class. A traveling teacher, who is a practical railroad man, travels from one division point to another. He is employed for a period of five weeks by the public schools of each town where a division point is located. A suitable place for holding the classes is selected. It may be in the Safety-First meeting room, the railroad Y.M.C.A., the apprentice classroom, the school building, or any room available around the railroad premises which is convenient to the most men desiring to attend the school.

This is a co-operated service arranged between the local board of education and the State Board for Vocational Education whereby the teacher's salary is paid out of state and federal vocational education funds. Thus, no expense is incurred by the railroad company or by members of the class. Classes have been furnished to employees of the following railroads: Missouri Pacific; Chicago, Burlington & Quincy; Chicago, Rock Island & Pacific; Atchison, Topeka & Santa Fe; St. Louis-San Francisco; Missouri-Kansas-Texas; Kansas City Southern; Kansas City Terminal; Wichita Terminal Association; Chicago Great Western; Chicago & Alton; Wabash; Union Pacific; Chicago, Milwaukee, St. Paul & Pacific; Texas Pacific; Trinity & Brazos Valley; International-Great Northern; Ft. Worth & Denver City; Kansas City, Mexico & Orient, and St. Louis Southwestern.

Many air-brake supervisors and mechanical-department officers, or their representatives, have investigated this system of instruction by personal attendance at classes. Without exception each one has expressed his approval of the plan. Recently 1,200 questionnaires were mailed to railroad officers and men who had attended the school and only favorable comment was expressed concerning the method of teaching or the instruction given.



Teaching air brakes via the blackboard

Some of the features which appear to make the school a success are that sufficient time is given to learn all devices; the students feel free to ask the teacher questions that they would not let their supervisor find they did not know; the teacher has only to teach—he has no duties pertaining to supervision; the teacher is a practical railroad man and also meets the teaching qualifications required by the public school authorities; the benefit of experience of professional educators to assist in working out a program of scientific methods of teaching and examination; the teacher is practical and in no way does his instruction conflict with a road's rules; classes are usually brought to a place by the men finding out about the school and circulating a petition to their local school board; no expense to the men or the railroad; personal instruction to assist in studying books and correspondence course, and co-operation with present courses of railroad or correspondence schools.

Requests for air-brake schools by men and railroads have been made that would require at least two years to fill. A number of men are preparing themselves to teach under this method and, as all states have a vocational education law, it is believed by authorities that there will be more such schools not only in air brakes, but also covering all railway educational programs.

The apprentice school room at the Osawatomie, Kan., shops of the Missouri Pacific is used as a class room

Air Resistance of High Speed Trains*

By O. G. Tietjens and K. C. Ripley†

A study of the economic possibilities for increasing passenger train speeds by reducing the air resistance. In this part of the article the results of wind tunnel tests on interurban car models indicate the relatively greater effect of air resistance on cars operating as single units

IN making the interurban-car models it was decided to provide two, one of a present-type car and one of a perfectly streamlined car, and to have a number of parts on one model that were interchangeable with the corresponding parts on the other. In this way it would be possible to change by gradual steps from a present-type car to a perfectly streamlined car, and by making tests after each of these changes to find the relative importance of the various changes in shape. The two types of models are shown in Figs. 7 and 8, and it will be seen that the streamlined car would have a larger passenger capacity than the present-type car. Eight different tests were made on these models, but for sake of brevity the results of only four will be given here, as shown in Fig. 9.

Car No. 1 referred to in Fig. 9 is the perfectly streamlined car. Car No. 2 is car No. 1 made the same in the rear as in the front for two-way operation. Car No. 3 is car No. 1 with the windows and under parts of the present-type car, but with streamlined front, rear, and roof. Car No. 4 is the present-type car. The

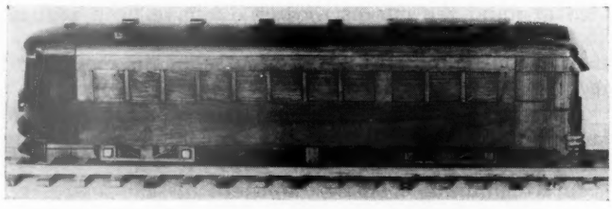


Fig. 7—Model of present type suburban car

scale of the models is 1:25. Trolleys were omitted from the models.

The weight of each of the full-sized cars was taken as 25 tons, and the projected area as 83 sq. ft.; so that by using Equation [1], one could, if desired, construct curves of total resistance and of horsepower required by the different full-sized cars as functions of the speed of the cars, assuming no scale effect to exist with the models. If this were done it would be found that for the partially streamlined car, No. 3, the saving by streamlining, in horsepower required to overcome total resistance, would at a speed of 50 m.p.h. amount to about 40 per cent, and at 35 m.p.h., to about 30 per cent. The reason for this large saving effected by streamlining interurban cars as compared with that brought about by streamlining trains is due to the fact that as compared with a train, the air resistance of a car forms a

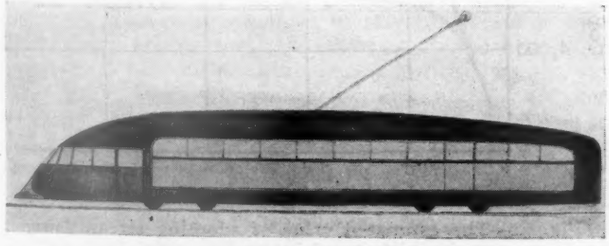


Fig. 8—Sketch of streamlined interurban car following the lines of the model tested

larger part of the total resistance, and this because of the lighter weight of the interurban car in proportion to its projected area.

Such curves of total resistance and of power consumption have a much more limited use for interurban cars than for trains due to the short distance between stops for the former. Much more useful curves for frequent stop service are those showing the effect of streamlining upon the performance of a car as a function of the length of runs in miles per stop. In this

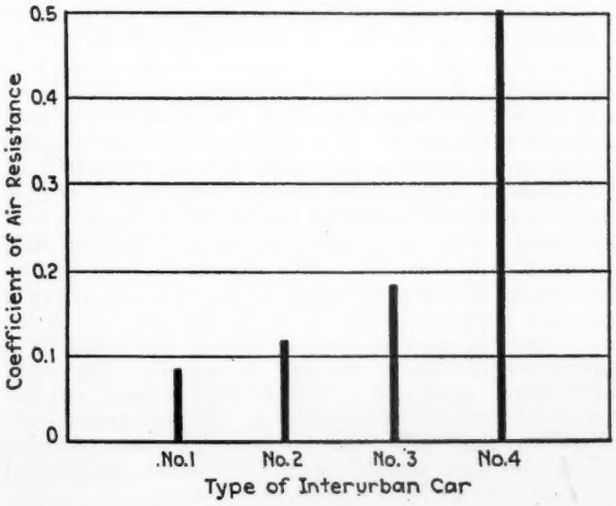


Fig. 9—Coefficients of air resistance of interurban cars

way account is taken of the fact that with a frequent-stop service a portion of the operating time is required for accelerating and retarding the car, which means that the average resistance of the car may differ considerably from that existing when the car has reached its normal running speed.

* This is the concluding part of an article abstracted from a paper presented before the American Society of Mechanical Engineers during the annual meeting at New York, November 30 to December 3, 1931. The first part of the article appeared in the January issue.

† The authors are connected with the research laboratories of the Westinghouse Electric & Manufacturing Company, where Dr. Tietjens is now in charge of hydrodynamics and aerodynamics.

To make calculations on the energy consumption in kilowatt-hours per stop for various interurban cars for various lengths of runs per stop and for various normal or "top" speeds, it is necessary to make certain simplifying assumptions. One of the most important of these is as to how the car shall be accelerated—whether at a constant rate by use of oversize motors and special control equipment, or by the common method of a variable acceleration for a large portion of the acceleration period while the "balancing speed" is being reached. For

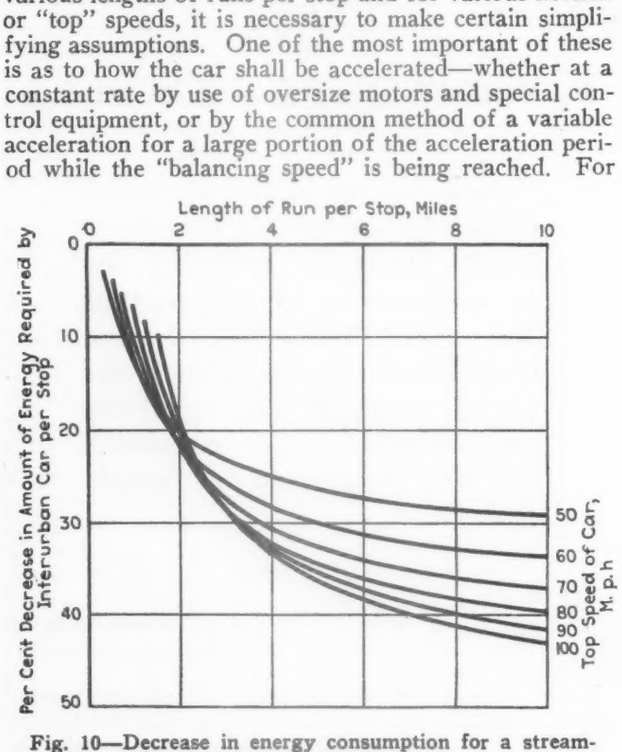


Fig. 10—Decrease in energy consumption for a streamlined interurban car

(Weight of car, 25 tons; projected area, 83 sq. ft.; grade, 0.25 per cent; acceleration, 1.7 m.p.h. per sec.; braking, 2.0 m.p.h. per sec.; reduction of air resistance, 65 per cent; ratio of schedule speeds before and after streamlining, 1.0)

comparatively long lengths of run per stop a constant acceleration up to the normal running speed of the car is not important, but in short lengths of run where it is desired to make a high schedule speed, the matter resolves itself into a question of the comparative economy, everything considered, of a constant acceleration and a given normal speed as compared with the alternative of a decreased acceleration during "balancing," with a necessarily higher balancing speed for the same schedule speed. For short lengths of run and high schedule speeds it is economical to use a constant acceleration up to substantially the top speed of the car, and hence a constant acceleration of 1.7 m.p.h. per sec. up to the top or normal running speed of the car was assumed in calculating the curves of Figs. 10 and 11. The other assumptions upon which the curves were based are given in the captions of the figures. It was assumed for simplicity that, after reaching their normal running speed, the cars would run at a constant speed until braking for making a stop became necessary.

Two Purposes of Streamlining

Interurban cars may be streamlined for either of two purposes: To reduce the energy consumption for the same schedule speed, or to increase the speed of the car without increasing its energy consumption. Fig. 10 shows the percentage that the energy consumption of the present-type car can be decreased for the same schedule speed by only partial streamlining, such as in car No. 3. Fig. 11 shows the percentage by which the normal running and the schedule speeds of car No. 4 can be increased without change in energy consumption by partial streamlining, such as in car No. 3.

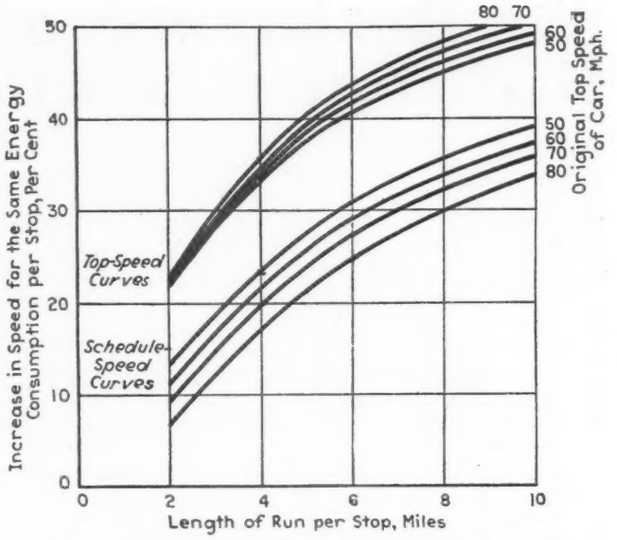


Fig. 11—Increase in schedule and top speeds for a streamlined interurban car

(Length of stop = 5 sec. per mile)

As in the case of trains it is of interest to gain some idea of the economic importance of streamlining as applied to interurban cars, this time as a function of length of run per stop as well as of speed. With this idea in mind the curves of Fig. 12 have been plotted. These curves include only the savings due to decreased energy consumption for the same schedule speeds and acceleration.

It may be well at this point to call attention to the fact that one large interurban company is now using cars that have a balancing speed of 79 m.p.h.

In streamlining it is not sufficient to take a present-type train and round off a few corners or change somewhat the front part of a locomotive. The whole train

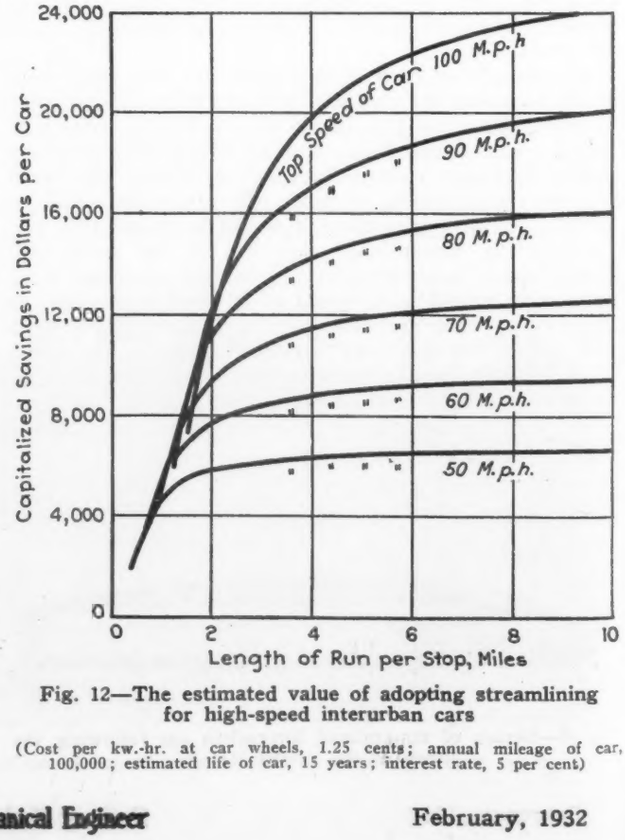


Fig. 12—The estimated value of adopting streamlining for high-speed interurban cars

(Cost per kw.-hr. at car wheels, 1.25 cents; annual mileage of car, 100,000; estimated life of car, 15 years; interest rate, 5 per cent)

has to be considered as a unit and the very first layout of the design of locomotive and coaches must be based on experimental data already obtained and on theoretical considerations regarding air resistance. A feeling how a train or an interurban car should look in order to have low air resistance will be of considerable assistance in designing streamline trains. Such a feeling, however, can only come as the result of work for many years on air resistance.

A striking example may be cited showing that good common sense is not in itself sufficient in rating the excellence of a particular shape of a body as regards its air resistance; but it would lead too far into the theory of air resistance to furnish an explanation. Fig. 13 shows two bodies of equal air resistance, assuming a

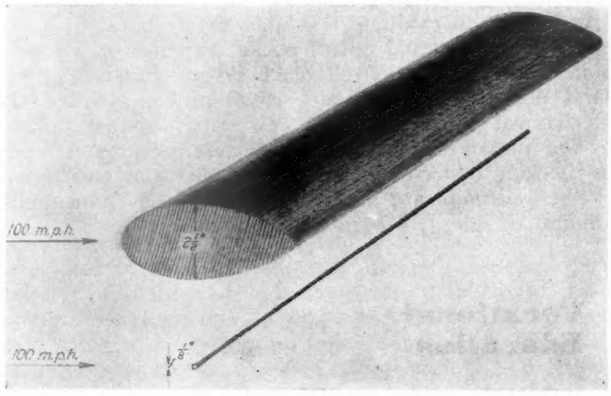


Fig. 13—Strut and rod having the same air resistance for a velocity of 100 miles an hour

speed of 100 m.p.h. The rod has a diameter of ⅛ in. and the strut has a cross-section whose maximum width perpendicular to the direction of air flow is 2½ in.

General Conclusions

The aim of this paper has been to emphasize, first of all, the importance of considering air resistance in its relation to high-speed transportation. It has then been shown in what manner the air resistance can be determined more precisely than by using one of the existing train-resistance formulas. Furthermore, it has been pointed out that a considerable saving in the power required can be obtained by the streamlining of high-speed trains and interurban cars, and it has been shown how this saving will affect the economics of the problem of high-speed transportation.

The savings in power consumption made possible by streamlining could be utilized to bring about some of the improvements proposed by Egmont Arens in a recent article entitled "The Train of Tomorrow." * Air conditioning, it is believed, will be one of the most desirable of these.

Of course it is beyond any dispute that existing rolling stock cannot be scrapped merely to replace it with streamlined equipment. However, it should be clearly understood that railroad companies anticipating the future development of high-speed trains should start now to build experimental trains of streamlined shape, in order to acquire the experience necessary for the final design of the trains of tomorrow.

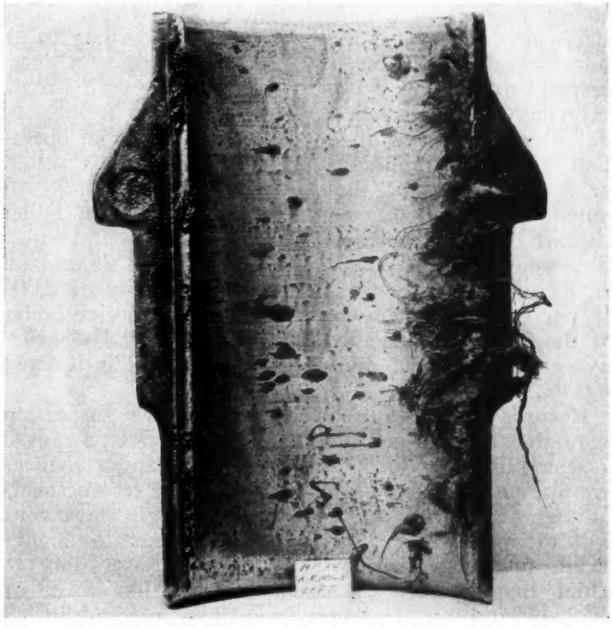
As the authors see it, the question is not whether the streamlined shape will be adopted, but when this will happen and who will be the first in this new field of modern transportation.

* Advertising Arts (Supplement of Advertising and Selling), July, 1931.

Railroad-Car Lubrication Tests

(Continued from page 56)

The frictional resistance and viscosity of each oil under varying conditions of load, speed and temperature will be carefully observed. Waste grabs with various oils, not only with applications of the brakes, but also under sub-normal temperature, will be studied. Also, reversal of rotation to the dry side of the journal,



Journal bearing showing the results of the waste grab

as is frequently encountered in switching service, will be considered.

At the present time tests will be confined to standard journals. At a later date, the program includes test operations with totally enclosed ball-bearings and rollers bearings, each with oil and grease lubrication. To date, a series of three tests with reference oils have been run, largely to determine the effect of pour on waste grab.

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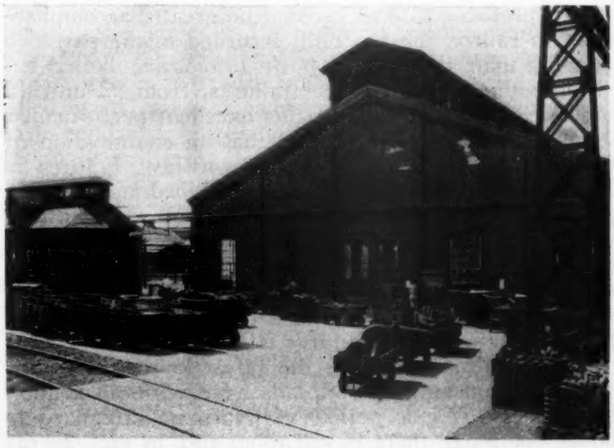


Motorized material handling at Huntington, W. Va., on the Chesapeake & Ohio

EDITORIALS

Latent Energy in Locomotive Boilers

Not everyone realizes how much latent or stored-up energy there is in a modern steam locomotive of large size, carrying heavy boiler pressure. According to an interesting letter recently received from a correspondent, a heavy 2-10-4 type locomotive on his road, carrying 250-lb. pressure, would have 81.5 million ft. lb. of energy stored in the steam under normal operation, and 6,960 million ft. lb. of energy in the water, or a grand total of slightly over 7 billion ft. lb. of kinetic energy to be liberated, in the event of boiler rupture. For purposes of comparison, a 10-in. projectile. weighing 400 lb., requires only about 25 million ft. lb. of energy to give it a muzzle velocity of 2,000 ft. per sec. In other words, when a locomotive boiler of the size mentioned explodes, the potential destructive effect would be equivalent to that of 280 of these 400-lb., 10-in. shells.

Records of the Bureau of Locomotive Inspection show that fully 90 per cent of all fatal accidents caused by the failure of locomotive parts and appurtenances are due to boiler explosions as a result of crown sheets failing, and these failures are increasingly hazardous with the increased size of modern boilers and the higher steam pressures carried. In one case, according to Chief Inspector Pack's recent report, "The force of the explosion tore the boiler from the frame and hurled it forward 429 ft. The boiler alighted on the track and then slid forward for some distance, where the locomotive running gear and train collided with it, resulting in the derailment of the running gear, tender and 14 freight-train cars, 8 of which caught fire and were destroyed." In another instance, "The locomotive was moving backward at the time of the accident. The force of the explosion tore the boiler from the frame and hurled it forward, or in the opposite direction from which the locomotive was moving. The boiler first alighted on the back head, then bounded and alighted on the front end, after which it rolled over and came to rest 155 ft. east and 35 ft. north of the point of the explosion."

It is probably safe to say that no greater accomplishment in railroading has been recorded in the past two decades than the reduction of locomotive boiler explosions due to crown-sheet failures, from 92 in 1912 to 13 in 1931. In spite of this excellent performance, it must be admitted, however, that an examination of the records shows two more crown-sheet failures in 1931 than in 1930, four more people killed and 27 more people injured. In fact, in recent months, boiler failures have been occurring all too frequently, and the necessity of redoubled vigilance in every phase of locomotive boiler construction, maintenance, equipment and operation is apparent if a continued reduction in the number of boiler failures is to be made.

While railroad travel is the safest known means of transportation and the railroads have achieved a notable success over a period of years in safeguarding boiler operation, there is still room and, in fact, an urgent necessity for further improvement. Probably man-failures in this connection can never be entirely eliminated, but the question may well be asked if everything possible has been done to minimize their effect and if all practicable mechanical safeguards have been applied to forestall failures of the human element or at least limit the attendant damage. The results of boiler explosions, largely due to crown-sheet failures, in loss of life and personal injuries, with accompanying damage claims, damage to equipment and lading, and particularly loss of prestige and public confidence, are difficult to evaluate. It may safely be said, however, that the actual out-of-pocket expense of a single boiler explosion may well reach several hundred thousand dollars. It is equally essential to provide full mechanical precautions and safeguards against failure of the human element and to exercise the greatest care in checking boiler maintenance and operating conditions if the railroads are safely to employ the tremendous amount of energy stored in locomotive boilers.

* * *

Vocational Education

Appearing elsewhere in this issue is an article by C. M. Drennan on Teaching Air Brakes. Mr. Drennan is employed by the Kansas State Board for Vocational Education. According to his own statement, his salary is paid partly by the State Board and partly by the federal government. A total of 21 railroads and 1,750 railroad employees have taken advantage of this educational service. The author refers to several enthusiastic recommendations by mechanical-department officers relative to the character and quality of the instruction offered.

The instruction methods outlined in the article are extremely simple and obviously depend for their success to a very large degree not only on the practical knowledge of the instructor, but also on his teaching skill. To be able to carry through a program of effective instruction, dealing with the functions and ailments of the universal-control valve, for instance, with the aid of nothing more than a blackboard and a piece of chalk, is a task which requires nothing short of genius. Genius is a rare quality and the supply would scarcely equal the demand were such methods to be universally adopted in all of the vocational training activities of the railways.

But the article raises a much broader question than the instruction methods employed.

Here is a system of vocational training for the benefit of a single industry and of a limited number of its employees, which costs the industry nothing and the employees only the time which they spend in classes. The taxpayer foots the bill. If the states and the federal government, jointly, are willing to foot the bill for a form of training which assists firemen to pass their examinations, enginemen to improve their knowledge of air-brake equipment and their technique in operating it, and shop men to become expert air-brake repairmen, why should not any ambitious employee on the railroad demand that he be furnished instructions which will improve his skill or capacity in the conduct of his job—

also at the expense of the taxpayer? Why should the railroad continue to spend any more of its money for the educational training of apprentices? Why not turn that job over to the state? Why, indeed, should any industry, large enough and with enough employees to be a political force in the community, continue to incur the expense of its own vocational training activities?

It may be that the public welfare demands that some attention be given to vocational training for the youth of the community and for those poorly adjusted or handicapped individuals who have been unable by their own efforts to fit themselves into the productive life of the community. It may be also that, to be effective, such training activities must have the co-operation of the industries of the community. It may be that our public school system needs some modification to provide its graduates with a more realistic knowledge of the industrial environment in which they must spend their active lives. To meet these demands from the standpoint of public welfare, however, would scarcely seem to justify taking on the responsibility of specialized vocational training, within individual industries, and thus relieving the industries of a function from which in the long run they are bound to profit privately.

No doubt the railroads and many other industries have lacked a vision of the real possibilities and have been slow in adopting adequate methods of employee training. On the railroads, however, it is not in providing special groups of employees with instructions concerning the operation and maintenance of such equipment as air brakes that the railroads have been deficient. To relieve them of responsibility where it has been most fully recognized would seem to be a questionable method of arousing them to a sense of a similar responsibility in other directions.

Reducing Expenses Or Reducing Costs?

Some railroad men seem to have reached a conclusion that to suggest the advisability of purchasing new shop equipment under present-day conditions is little short of heresy in view of the fact that every effort is being made to reduce the expenses of operation and maintenance. Unfortunately the viewpoint of many men in railroad work on the subject of reducing expenses differs widely from that of men in other industries. There is a vast difference between the terms "reducing expenses" and "reducing costs" and while it is undoubtedly true that the railroads have gone a long way in reducing expenses there is a fertile field ahead for those who will give some real serious thought to the problem of reducing costs.

There is not a railroad shop in this country that is not losing money for the company that owns it as long as it continues to operate obsolete machine tools and shop equipment on modern repair work or to attempt to operate even modern equipment in combination with methods and practices that should have been abandoned years ago. From the standpoint of modern management there is probably less known about the railroad shop than any other type of industrial plant due partly to the fact that it is essentially a repair plant rather than a manufacturing plant and consequently must deal continuously with unknown and uncertain factors of production.

During the past two years the greater part of the reduction in mechanical-department operating expenses can be traced directly to reductions in wages due to reductions in forces and part-time employment, and to curtailment in the purchases of material and supplies used in equipment maintenance. There is no doubt that here and there tangible economies have been effected by a revision of practices and the installation of modern equipment. Taken as a whole, however, the railroad shop offers many real opportunities for the use of modern equipment in a manner that will pay for that equipment in a short period of time.

There comes a time in every industry when a reduction of expenses can no longer be accomplished by further curtailment in employment and material purchases. From then on it is a question of reducing costs. That time has arrived for the railroad industry and declining revenues as a result of other forms of competition only serve to emphasize the urgent necessity of being prepared to say just where and how costs of operation can be reduced. Modern equipment and modern methods are the solution to the problem. The application of these facilities to the solution of the problem is a matter of the education of railroad men to produce a change in thei viewpoint.

Hidden Treasures

Many years ago a young man with an attractive personality was graduated from an engineering college and entered railroad service at the foot of the ladder, as a machinist apprentice in a locomotive repair shop. Finishing his time, he became a machinist and remained in that position for many years. Just why he failed to advance is hard to explain. Possibly he lacked the right sort of coaching on the part of an older man, changes in shop administration may have caused him to be overlooked, or he may have had some unfortunate experience which discouraged efforts on his part to secure a better position. He married, started to raise a family, and took an active and aggressive part in local, civic and social affairs—but continued to function as a mechanic in the shop.

Twenty years or so after he entered the service, a change in policy on the part of the mechanical department made it necessary to have on the supervisory staff at the local point a man with technical training. It was difficult to find such a man at this particular place and it looked as if someone would have to be brought in from the outside. In some way, largely accidental, it came to the attention of the management that one of the shop mechanics had a technical training and might qualify for the position. Largely, therefore, because nobody else was readily available, the mechanic was called in and given a chance in the new position. He made good in a large and surprising way, quickly and strikingly justifying his promotion.

Undoubtedly large numbers of the workers on American railroads and in the mechanical departments of the railroads possess qualifications and training which fit them to do a much better grade of work than they are now performing. Large potential values lie buried because the managements do not make any organized effort critically to study and examine each individual in the organization, whether in a supervisory position or in the ranks.

The mechanical departments of the railroads have spent great amounts of money to replace obsolete tools and equipment and modernize their plants and practices, even to the smallest detail. This is important;

indeed, it is vital that the plant and equipment be kept up-to-date, utilizing the latest and best facilities and equipment, so that the railroads may render the best possible service with a minimum of expenditure. On the other hand, it must never be forgotten that in the human element in the organization lie almost untold possibilities for securing better and more efficient results. Modern up-to-date material, machines and equipment can only give the best account of themselves when they are operated and controlled by well trained officers and workers possessing the greatest skill and intelligence. It is just as essential to foster and improve the human element and know and understand it thoroughly and intelligently as it is to keep the machines and equipment up-to-date and in good condition and repair. And yet, how little careful and thoughtful attention is given to discovering and developing the hidden potentialities of the men in the organization.

Cars for Grain Loading

According to the records of the American Railway Association, Freight Claim Division, the principal claim-producing items handled by the railways are grain, grain products, live stock, fresh fruit and vegetables, forest products, sacked goods and merchandise. In 1930, 23.4 per cent of all the claim payments due to defective equipment was caused by damage to grain, and 13.1 per cent by damage to flour and mill stuffs. The great importance, therefore, of keeping cars used for this type of loading in the best of condition can hardly be over-emphasized. As was pointed out at the December meeting of the Northwest Car Men's Association, St. Paul, Minn., a car to be suitable for this class of loading must have a tight floor, lining, sheathing and roof, with trenches free to allow grain to sift through, close-fitting doors, and an interior free from protruding nails, bolts, sharp edges, etc. A good method of finding these nails and projections is to scrape the walls and floor with a straight-edge board. Also the door posts must be in good condition, as there have been cases in which it was necessary to transfer a load on account of a broken door post.

A close inspection, both inside and outside, is essential inasmuch as a car which appears to be in 100-per cent condition, judging from the outside appearance, may be unfit on account of previous loading of such materials as oil, hides, fertilizer, or other commodities which leave a strong odor. Regarding the possible damage to lading as a result of previous shipments, an interesting case was cited by H. R. Grochau, assistant freight claim agent of the Chicago, St. Paul, Minneapolis & Omaha, at the meeting referred to, as follows: "A very serious case of poisoning of animals resulted in a loss of nearly $12,000. A car was loaded with 135 barrels of powdered arsenic. After unloading, no report was made as to leakage. The car was later inspected and placed for loading oats consigned to a lumber camp. The oats were unloaded and some of the grain given to horses, 19 of which became sick and died. Farmers who bought part of the oats began losing live stock. Post-mortem examinations disclosed arsenic poison."

The originating carrier, after the arsenic was unloaded, delivered the car to another carrier who made inspection and pronounced it "O. K. for Grain." The question may well be asked if the carrier furnishing the car for oats was liable or the carrier transporting the arsenic, or both. Under the freight claim rules, according to Mr. Grochau, the carrier furnishing the equipment is liable, but it is not unreasonable to expect, in cases where poison is transported, that the unloading carrier should thoroughly inspect the car and clean it, if necessary, before permitting any subsequent loading. The unloading carrier knew what the car contained, whereas the other carrier overlooked the innocent-appearing white substance on the floor and approved the car for further loading. While this case was unusual, it unquestionably demonstrates the need for careful inspection and the closest co-operation between railroad men on all lines, if losses such as this are to be avoided and railroad service maintained on the basis which will meet the expectations of the public.

That flour and grain shippers are sometimes excessively technical and reject cars without adequate cause cannot be denied, and this practice is not only expensive to the carriers but constitutes a cross which, in the last analysis, the car-department supervisor and inspector must bear. An incident which would be amusing, if not so serious, as indicating a shipper's idiosyncrasy, was reported by J. H. Remick, general car inspector, Northern Pacific, at the St. Paul meeting, as follows: "Tonight my attention was called to a new one in connection with flour cars. Within the last few days, one of our cars was rejected at the mills, partially loaded because a little mouse got into the car and chewed on some of the sacks. I presume we will now have to add mouse traps to our repair-track equipment." It is doubtful if railroads will ever get to the stage of furnishing mouse traps in their house-car equipment, but one thing they must do, and that is provide this equipment in such condition as to meet the shipper's requirements and move loads to destination without danger or delay.

NEW BOOKS

A.S.T.M. TENTATIVE STANDARDS *(1931 Edition) Published by the American Society for Testing Materials, 1315 Spruce street, Philadelphia, Pa. 1,008 pages. Price, paper binding, $7; cloth binding, $8.*

Forty-two new tentative standards are included in the 1931 edition of A.S.T.M. Tentative Standards, which is an annual publication. The volume contains 180 tentative specifications, methods of test, definitions of terms and recommended practices in effect September 1, and a comprehensive subject index and table of contents. Forty-four of the standards relate to metals and 136 to non-metallic materials and products, in the ferrous metals group being specifications for heat-treated carbon-steel helical springs, carbon-steel forgings, and normalized and tempered alloy-steel forgings for locomotives, etc. Specifications involving non-ferrous metals include magnesium-base alloy castings, copper-base alloys in ingot form for sand castings, aluminum-base and zinc-base alloy die castings. In the non-metallic materials group there are specifications for the concrete field, building industry, insulating materials and rubber products, also tentative specifications involving textile materials. The term "tentative" applies to a proposed standard published for one or more years, with the view of eliciting criticism, before it is formally adopted as standard by the Society.

THE READER'S PAGE

Renewing Arch Bars—A Question

To the Editor:

To settle an argument, I would like to know if it is improper repairs to apply a 1¾-in. by 4½-in. arch bar on a truck having a 1½-in. by 5-in. bar standard to the car.

A Subscriber.

Save the Cost Of Material

To the Editor:

After January 1, 1936, cars equipped with arch-bar trucks will be prohibited in interchange.

There are a number of 40- and 50-ton cars being retired due to the underframes being worn out, while the trucks are in good condition. Many of these cars are equipped with the cast-steel truck side frames, the majority of which meet A.R.A. requirements. At the same time there are a number of 40- and 50-ton cars with good underframes and arch-bar trucks.

The good cast-steel truck frames taken from cars that are being retired could be applied to cars with good underframes, in place of the arch bars, at a considerable saving in material, thus prolonging the life of such cars.

These cast-steel truck side frames when thrown into the scrap pile are only worth around $3 each, whereas, if applied in place of the arch bars, would be worth about $35 each.

W. H. Shiver.

Energy Stored In Boilers

To the Editor:

In computing the amount of energy stored up in a modern 250-lb. pressure locomotive boiler that would be liberated as a destructive agency upon the rupture of the boiler, I have taken a large 2-10-4 class locomotive for a concrete example.

These locomotives have a steam space of 196 cu. ft. and a water space of 838 cu. ft. The energy released from the steam equals $196 \times 0.573 \times (1{,}115.5 - 180.0) \times 778 = 81{,}500{,}000$ ft. lb., where 0.573 is the weight per cu. ft. of steam at 250-lb. pressure, 1,115.5 B.t.u. the total energy in the steam at 250 lb., 180.0 B.t.u. the energy in the water at atmospheric pressure, or 212 deg. F., and 778 the mechanical equivalent of heat. The energy released from the water equals $838 \times 53.19 \times (380.4 - 180.0) \times 778 = 6{,}960{,}000{,}000$ ft. lb. where 53.19 is the weight per cu. ft. of water at 250 lb. per sq. in. gage, 380.4 B.t.u. the heat in the water at 250 lb. per sq. in., and the other values the same as given above. This would give a total kinetic energy liberated of 7,041,500,000 ft. lb. when the time element is too short to allow a loss of energy due to radiation.

As a comparison, Kent gives the kinetic energy as 24,844,000 ft. lb. for a 400-lb. 10-inch projectile, which has a muzzle velocity of 2,000 ft. per sec. In other words, using the round figures of 7,000,000,000 ft. lb. and 25,000,000 ft. lb. for the boiler and for the 10-in. shell, respectively, the destructive value of the boiler would be equal to 280 shells, provided, of course, that the boiler explosion is instantaneous, which it is not.

N. B. Smith.

Arbitration Case No. 1677—A Correction

To the Editor:

I noted in your November, 1931, issue, page 547, in the report of Arbitration Case No. 1677, Chicago, Rock Island & Pacific vs. Union Pacific, an erroneous statement with reference to what occurred to Union Pacific automobile car No. 171292.

Commencing in the twelfth line, your report indicates that "the end of the car dropped down on the ties." If this is correct, it would be difficult to understand the wording of the decision in view of Rule 32 (a). However, a careful reading of the case as reported under decision No. 1677 in A. R. A. circular D. V.-729 fails to show that the end of the car was down on the ties.

I call this to your attention so that you may publish a correction and thus dispel any misunderstanding which your report may have created. No doubt it will be very confusing to the carmen and others interested.

J. E. Mehan,
Assistant to Superintendent Car Department, Chicago, Milwaukee, St. Paul & Pacific.

(The abstract of Case No. 1677 to which Mr. Mehan refers was published in the November issue of the *Railway Mechanical Engineer* under the title "Failure of Weak Draft Arms Drops Underframe on Ties." The sentence to which he refers in the abstract of the case reads as follows: "The end of the car, including the body bolster, pulled away from the underframe, allowing the underfarme to clear the truck and drop down on the ties."

This is incorrect and, according to the decision of the Arbitration Committee, the title should read "Drops Center Sill on Ties" and the last clause of the sentence in question should read "allowing the center sill to clear the truck and drop down on the ties."

According to the agreed statement of facts as it appears in Circular D. V.-729, "The Bettendorf draft arms which are riveted to the single steel center sill were broken off just back of the body bolster. Examination of the track showed the ties marked for five pole lengths by the center sill." The following was included in the statement of the Rock Island: "In this case the truck was not pulled out from under the car, but the lead truck was pulled far enough ahead that it allowed the steel center sill to fall on the ties in the middle of the track." The Union Pacific in its statement said: "that when the accident occurred, the end of the car from directly back of, and including, the body bolster pulled away from the underframe, breaking the side plates near the end of the car and allowing the underframe to clear the trucks and drop down on the ties."

Except for the substitution of the words "center sill" for "underframe" in the two instances mentioned, the abstract of the report as published in the November issue is correct.—Editor.)

With the Car Foremen and Inspectors

Cutting Costs of Freight-Car Repairs

STEEL car ends frequently are bent outward to a greater or less degree, owing to the action of the lading under shock encountered in road service as well as switching operations. Where a jacking stall is not available, the removal of a car end, its straightening and subsequent re-application result in a heavy labor charge. Under the unit freight-car cost system* installed on the Illinois Central in January, 1930, this immediately shows up on the cost sheets. The car-end straightener, illustrated, was developed at the Memphis shops, being designed to accomplish the straightening operation quickly and with a minimum of labor expense.

Station for rebuilding the drop doors of composite gondola cars when damaged beyond repair

The straightener consists of an 18-in. by 12-in. air cylinder, the piston of which, as well as a heavy steel bar extending from the back end, are equipped with two swiveling cross members, machined to fit the corrugations in the car end. The air supply to the cylinders is furnished through a valve and hose connection to the shop air line.

In operation, the car with a bulged end is placed next to one with a straight end, the coupler knuckles being removed and the cars chained together, as shown in the illustration. The couplers are usually about two feet apart. The car-end straightener is then suspended by a crane between the cars, one end of the straightener being placed at right angles to the corrugations in the freight car end and the other in line with the corrugations in the bulged car end at the point of maximum deflection. The application of air pressure in the cylinder in just the right amount will be found adequate to straighten the bulged end quickly without affecting the straight end of the other car.

This device is also used to good effect in the adjustment of loads. It is easily controlled, direct in action and seldom takes more than five minutes per car end straightened.

Straightening Steel Drop Doors

The unit freight-car-repair cost system had not been in effect long at the Centralia (Ill.) shops before it became apparent that an excessive number of man-hours was required for the straightening of the drop doors on composite gondolas, work which is done at one of the early positions in the repair line. Formerly as many as 12 men were sometimes required at this position in order to repair the drop doors and make sure they were in good operating condition and could be closed tight. Many doors had to be removed and, after straightening, great difficulty was experienced in getting them back into place again.

All of these difficulties have been largely eliminated by the use of the door-straightening method shown in the illustration. By the use of this method, the door-straightening gang has been reduced from 12 to 6 men, two cars being worked on at a time. The simplicity of the method can hardly be exceeded. An air cylinder provided with a pair of truck wheels and a handle for easy portability is simply used for raising one side of the car while blocking is applied between the rail and the center of the steel drop door, the front edge or, in fact, wherever it is bent. Reducing the air pressure in the cylinder, permits the car body to right itself and as it comes down, the weight straightens the door quickly and without the expenditure of manual labor. With a little ex-

Air cylinder arrangement developed at Memphis shops for straightening steel ends

*For a description of this cost system see the *Railway Mechanical Engineer* for October, 1931, page 479.

perience, the drop-door straightening gang acquires great dexterity and straightens the doors, one after another, in remarkably short time.

Drop doors which have been severely damaged are, of course, removed and repaired in order that the car, when completed, may be in condition to hold sand or fine coal without loss.

Manufacturing Drop Doors

Another illustration shows the final stations in the remaking of gondola-car drop doors too badly damaged

Portable air cylinder used in straightening composite gondola drop doors in place without removing them from the car

to be repaired. After being stripped from the car the doors are moved to a station at the north end of the shop where the steel straps and hinges are removed, straightened and reformed cold in a bulldozer to assure the correct alinement.

Woodwork for doors and assembly is handled at the station shown in the illustration, which is provided with an inclined rack fitted up for the rebuilding of six doors at a time with two men working, one on each side of each door. Provision is made in the rack for the support of the steel hinges, and the lumber received already machined from the mill-room is simply assembled in place on the rack, wedged together, steel straps put in place, and bolts and nuts applied using pneumatic tools. By this method of manufacture, lost motion is largely eliminated and the doors turned out in sufficient quantities to be ready for reapplication to the cars without delaying the line movement.

Pre-painting of Siding

Another practice which is, of course, followed by many roads is the application of the primer coat of paint to car siding in advance of application of the siding to the cars, thus saving almost a day in painting time after cars have been completely overhauled and repaired. The particular device used at Centralia consists simply of a drum which rotates in a tank of paint and feeds paint to the under-surface of the car siding as it is passed over the device. A brush on the outgoing end removes superfluous paint which drains back into the tank.

Decisions of Arbitration Cases

(The Arbitration Committee of the A.R.A. Mechanical Division is called upon to render decisions on a large number of questions and controversies which are submitted from time to time. As these matters are of interest not only to railroad officers but also to car inspectors and others, the Railway Mechanical Engineer will print abstracts of decisions as rendered.)

Wild Oil Well Sprays Tank Car—Handling-Line Responsibility

A. R. L. refrigerator cars Nos. 14929, 13890, 8952, 10283, and 16188 were delivered to the Armour Car Lines at Oklahoma City, Okla., on November 5, 1930, covered with oil. This damage occurred while the cars were standing on a track in the yard of the Chicago, Rock Island & Pacific at Oklahoma City just prior to delivery, by a wild oil well flooding the cars with oil. A request for defect cards to cover the damage to these cars, according to Paragraph 1, Rule 32, was presented to the Rock Island, but was declined on the ground that the rules of interchange do not cover the case. The Rock Island contended that in its opinion the decision in Arbitration Case 1465* is parallel, wherein the Arbitration Committee held that damage by oil was the owner's responsibility. The Armour Car Lines in its statement referred to the condition of the cars on being returned and pointed out that all of the cars had to be scrubbed with a solution of hot water and caustic soda, and also one of the cars had to be repainted. This damage did not occur in fair or ordinary service, it was contended by the Armour Car Lines, and was the result of an unusual and unnatural condition, against which the handling line should have protected by a movement of the cars and legal recourse against the Morgan Petroleum Company which owned the well. The car owners contended that Section 1 of Rule 32 is intended to protect against any damage resulting from such a condition.

The Arbitration Committee rendered the following decision: "Damage resulting from this cause, where definitely known how occurring, would come within the provision of Section 1, Rule 32. Handling line is responsible."—*Case No. 1683, Chicago, Rock Island & Pacific vs. Armour Car Lines.*

* A summary of case No. 1465, Swift Refrigerator Transportation Line vs. Texas & Pacific, was published in the August, 1927, issue of the *Railway Mechanical Engineer*, Page 554.

Defect Card Should Be Furnished For Omitted Stenciling

Seaboard Air Line car No. 83814 was repaired by the Illinois Central at East St. Louis, Ill., on February 17, 1930. Repairs for which charges were billed against the Seaboard consisted, in part, of the application of a second-hand 5-in. by 7-in. shank, 6½-in. butt, A.R.A. Type D coupler complete at the B end, in place of a 5-in. by 7-in. shank, 6½-in. butt, 12¼-in. head Simplex coupler, the shank of which was broken. All other parts of the coupler were serviceable. The repair card showed in the "Repairs Made" column the notation: "I. C. defect card 16757—February 17, 1930—applied to car account A.R.A. Type D coupler 5-in. by 7-in. by 6½-in. applied, should be 5-in. by 7-in. by 6½-in. by 12¼-in. head," and "Car not stenciled," and in the "Why Made" column the following: "Account car sten-

ciled coupler 5-in. by 7-in. by 12¼-in. head." The charges rendered were based on 75 per cent of the value of a new Type D coupler complete, less the scrap credit for the old style A.R.A. coupler butt, and second-hand credit at 50 per cent of the value new for the old style knuckle, lock and pin. The Seaboard claimed that the stenciling not having been changed as required by the sixth paragraph of Section C, Rule 17, the charge should be confined to the 50 per cent new value of a 5½-in. by 7-in. A.R.A. temporary standard coupler complete which was standard to the car. While admitting that no specific reference to a penalty for failure to change the stenciling required by this paragraph of the rule was included in it when the former interpretations 11 and 13 were replaced by this paragraph in the 1930 rules, it contended that this did not abrogate the penalty, the nature of which is set forth in principle in the fifth paragraph of Rule 87. The Seaboard pointed out that failure to change the stenciling leaves the owner liable to a repetition of the increased charge for the betterment should the Type D coupler require replacement after having been pulled out or lost from the car. The Illinois Central contended that when interpretations 11 and 13 were dropped from Rule 17 and replaced in the 1930 rule by paragraph 6, Section C, the omission of the penalty was intentional and in keeping with the fact that the association, as a general proposition, has never recognized penalties as the proper media for enforcing compliance with the rules. It contended that should occasion arise where, as the result of improper stenciling, a former standard coupler was applied in place of a Type D coupler the car owner would be amply protected from loss under the provisions of paragraph 5, Rule 95. It called attention to the fact that in 1929 the association had ruled that stenciling for D type couplers and K triple valves was no longer an A.R.A. requirement.

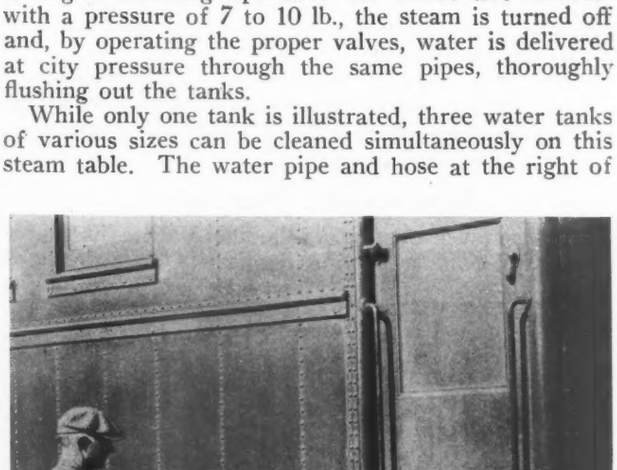
The following decision was rendered by the Arbitration Committee: "Charge should be on basis of coupler applied, but repairing line is responsible to the car owner for the omitted stenciling and should furnish a defect card to cover the expense of changing the stenciling."—*Case No. 1682, Seaboard Air Line vs. Illinois Central.*

Cleaning Water Tanks

THE great care exercised in all phases of the terminal servicing of passenger equipment at the California avenue (Chicago) coach yard of the Chicago & North Western was fully described in a paper presented by A. W. Berger, assistant district master car builder of this road, at the November meeting of the Chicago Car Foremen's Association. Among the details touched upon in this paper was the cleaning of water tanks and the precautions taken to assure that all operations involved in the cleaning and filling of these tanks should be conducted under the most sanitary conditions.

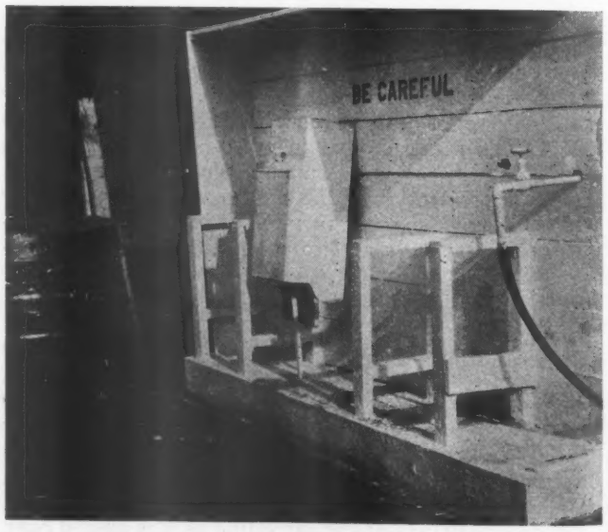
The water tanks are rinsed thoroughly with clean water once a day, being removed from the cars and cleaned by steaming at least once a week. For the latter operation, the steam table shown in one of the illustrations is used. This table, divided into two small and one large section to accommodate various sizes of tanks, is equipped with three small pipes, extending vertically upward from the base and located so as to blow steam directly into the water tanks when the latter are placed over the pipes in an inverted position. Following a steaming operation for about five minutes with a pressure of 7 to 10 lb., the steam is turned off and, by operating the proper valves, water is delivered at city pressure through the same pipes, thoroughly flushing out the tanks.

While only one tank is illustrated, three water tanks of various sizes can be cleaned simultaneously on this steam table. The water pipe and hose at the right of the illustration are not used in connection with the steaming of water tanks, but simply furnish a convenient supply of water for other purposes.



Water hose equipped with special disc to prevent the nozzle from touching the ground in case of accidental dropping

Ice and water men are equipped with the necessary facilities to handle their work efficiently and in a sanitary manner. The second illustration shows the type of water hoze and nozzle used in filling water tanks and overhead water systems on cars. The circular disc is designed to keep the nozzle off the ground where it might become contaminated with dirt and possibly germs. This nozzle and disc, made of aluminum, are so proportioned that, if dropped, the nozzle end, being lighter, tips up. In this manner, any possibility of the



Steam table with capacity for steaming and flushing out three water tanks simultaneously

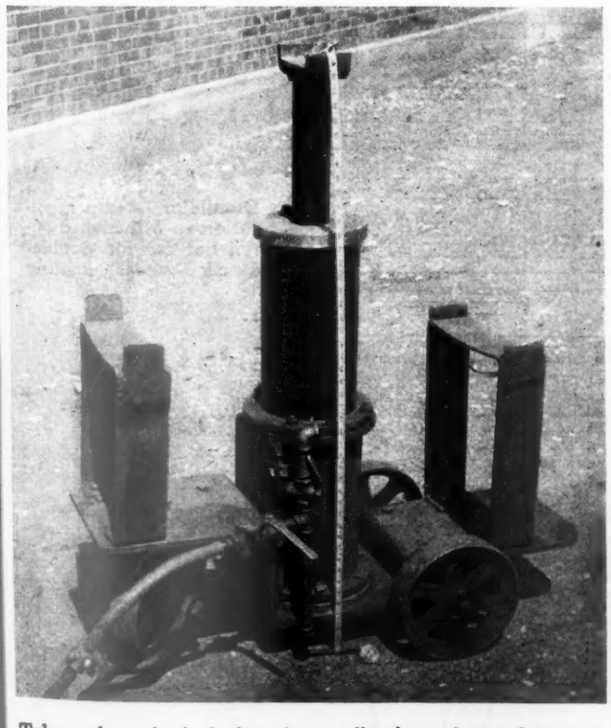
nozzle end of the water hose accidentally touching the ground or car floor is avoided.

Referring again to the first illustration, at the left will be seen one of two acid barrels which are provided with padlocked covers to avoid tampering with the mixture and consequent danger of using excessively strong cleaning solutions on the car exteriors. These barrels are filled every morning by one man who, alone, is responsible for seeing that they contain an adequate supply of cleaning mixture, comprising 20 lb. of oxalic acid to 50 gal. of water. This solution is drawn off as required by the car cleaners through the pipe and valve near the bottom of the barrel.

Telescoping Air Jack

A TELESCOPING air jack, developed especially for the quick and safe applications of couplers and draft gears, has been developed at the Milwaukee (Wis.) freight-car shops of the Chicago, Milwaukee, St. Paul & Pacific, the illustration being shown through the courtesy of the Milwaukee magazine. This jack consists primarily of an air cylinder mounted on a three-wheel truck, the design of which is clearly illustrated. The bore of the brake cylinder has been fitted with a steel cylinder which carries a smaller auxiliary piston and plunger. When air pressure is applied, a telescoping action results and the piston head has almost double the travel which could be obtained otherwise. In fact, a total height of 47 in. from the ground can be reached.

When used for the application of couplers or draft gears, air pressure is released through the release valve and ell and the piston head drops to its lowest position. The coupler or draft gear is then placed on the supporting brackets and the truck moved to the proper position beneath the car. Application of air pressure then lifts the coupler or draft gear into its final position with a single lift and without the time and more or less danger involved in the use of blocking. Air jacks for the application of draft gears are no novelty, but usually, at least two lifts are required, whereas the device, illustrated, does the job in a single operation.

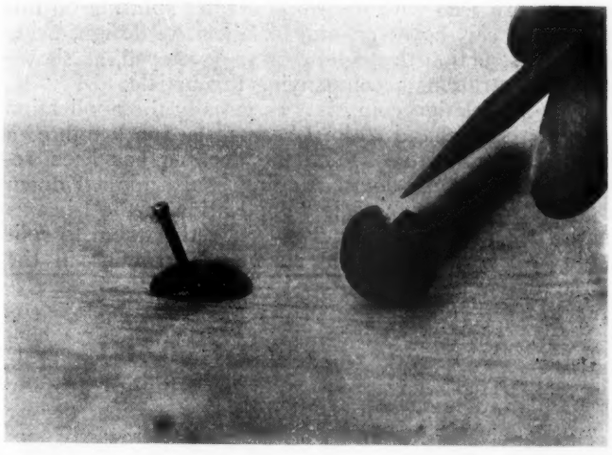


Telescoping air jack for the application of couplers and draft gears

Making Carriage Bolts Easy To Remove

By Frank Bentley

THE common carriage bolt used extensively in assembling wood work is an excellent device. However getting it out after a period of time with as little damage to the wood as possible is not always easy. When the wood is a bit old, it gives way and does not hold the square under the head. This renders it not so easy to get the nuts off the other end. The nuts are often



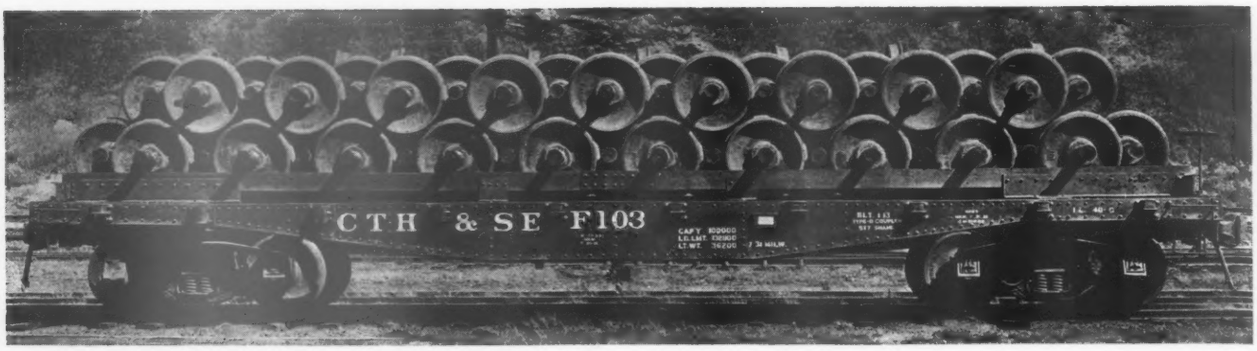
A small notch filed in the head of a carriage bolt facilitates its removal later on

located where they cannot be burned off or easily split off. Splitting them off does not do the hole or wood any good. To prevent all this trouble, file a V in the head as shown before putting in one of the bolts. When necessary to remove the nut some time later and the head turns, drive a small nail down through the nick and into the wood at the side of the bolt. A nut has to be very tight to overcome the resistance of the nail. This is a very handy precaution which takes but little time.

Double-Deck Loading Of Wheel Cars

THE double-deck loading of flat cars and gondolas in the movement of assembled car wheels and axles is not a new development, and yet, this practice is far less generally followed than would be justified by the resultant savings and advantages, which may be summarized as a reduction of at least 50 per cent, in loading time, equipment tied up in this service, switching and transportation expense, not to mention the saving in blocking material, reduced possibility of journal damaged and increased safety in loading a properly-designed car.

Experiments with double-deck wheel loading have been conducted on the Chicago, Milwaukee, St. Paul &



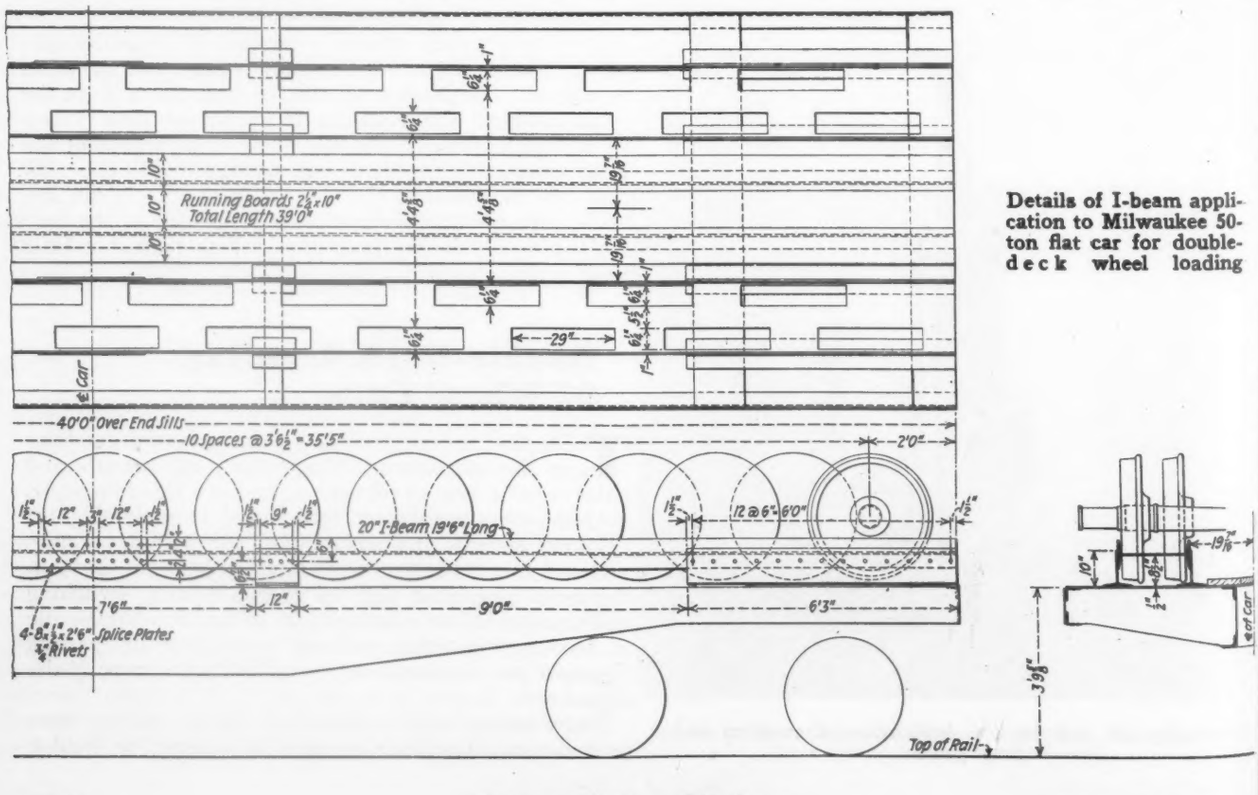
Side view of Milwaukee 50-ton flat car equipped with steel I-beams cut out for double-deck wheel loading

Pacific for some time, one of the first cars for this special service being equipped with permanent wooden cradles similar to those illustrated on page 32 of the January *Railway Mechanical Engineer*. Some difficulty was experienced with the wood cradles splitting on this particular car, however, and an alternate design, using steel construction throughout, was developed, as shown in the illustrations accompanying this article.

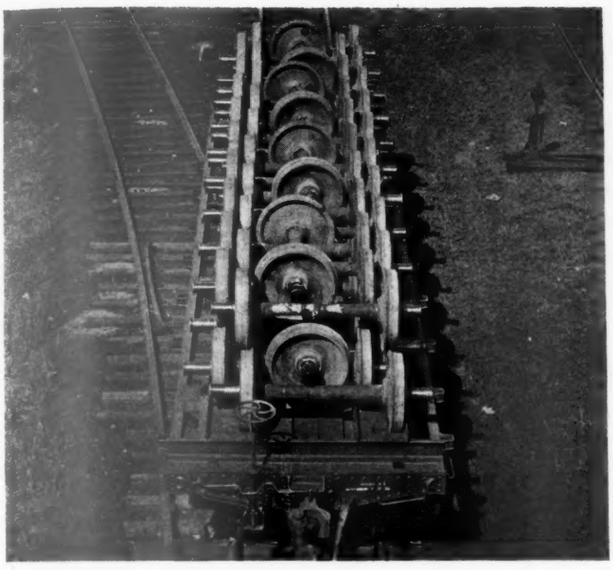
This new design comprises essentially the application of four second-hand 20-in. I-beams, the full length of a 50-ton flat car from which the decking has been removed and a three-board running board applied down the middle of the car. Rigid application of the I-beams to the car structure is secured by riveting them to split 20-in. I-beams. Alternate staggered openings in the horizontal webs of the I-beams are cut with the acetylene torch. These are 6¼ in. wide by 29 in. long, or just large enough to accommodate 33-in. wheels, which constitute by far the great majority of car wheels shipped. These staggered openings permit the loading of 21 pairs of mounted car wheels in the lower tier or deck, positively positioned so that there is just room for the car journals to extend between two adjacent wheels without any possibility of coming in contact with the wheels. In loading, each pair of wheels can be dropped in place by the locomotive or other crane without particular care in spotting, and with the assurance that the journals will not be damaged. Moreover, once in place, the wheels are positioned without further labor and material expense for blocking.

The upper deck of wheels is loaded with similar ease and with hardly any more care necessary to avoid damaging the journals. In addition, five or more pairs of wheels can be loaded longitudinally on the car, as illustrated, their journals, however, being protected in the usual manner. This makes a total of 46 pairs of wheels per car. The only anchorage necessary with this type of double-deck wheel loading is the application of U-bolts to the outside pair of upper-deck wheels on each end of the car. When it is considered that the Milwaukee sometimes ships as many as sixty cars of mounted wheels a month from its principal car-repair shop at Milwaukee, Wis., the potential savings due to the use of this type of equipment may be readily appreciated.

For the most economical use of this large-capacity car, combination loads are often required, inasmuch as many car-repair points cannot take the full complement



Details of I-beam application to Milwaukee 50-ton flat car for double-deck wheel loading



View of double-deck wheel-loaded car from above

of wheels. In such cases, it is usually feasible to arrange for partial-load deliveries, wheels required for the nearest points being loaded on the upper deck. A detailed estimate of money savings is difficult to arrive at and will not be attempted, owing to the many uncertain factors, such as labor and material cost of blocking, reclamation and re-use of blocking, variable switching charges, operating expense, etc.

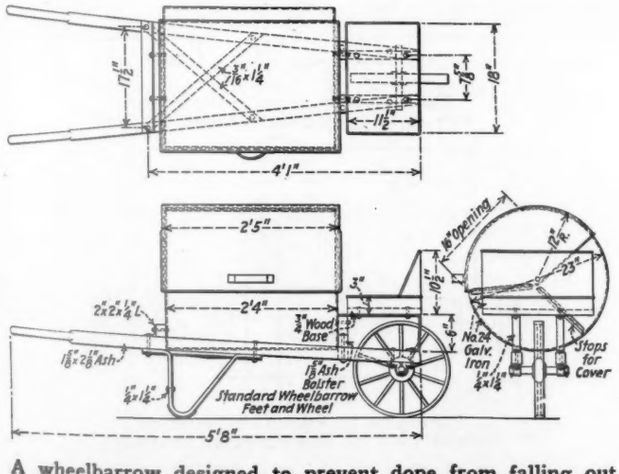
Wheelbarrow for Handling Dope

THE wheelbarrow shown in the drawing was designed by the car department of a railroad which has made a considerable study of the problem of hot-box prevention. As is well known, many hot boxes are caused by water, dirt, cinders and other foreign material getting into the journal box which dilute the oil and packing and thus destroy much of their effectiveness.

A considerable amount of this dirt and extraneous material was known to get into the packing when the dope was being handled from the barrels to the journal boxes. Previous to the time the new dope wheelbarrow was adopted, dope was handled about the yard and terminal in ordinary dirt-type wheelbarrows. Thus, the dope was exposed to rain, snow and anything else that happened to fall into it. Frequently some of the load would fall to the ground and in the process of recovery would pick up dirt and cinders.

The design shown is now the standard wheelbarrow for handling dope and is used at all points on the railroad where packing of journal boxes is performed. The body consists of a steel drum, with a 16-in. by 2-ft. 5-in. opening in the side which is closed with a revolving cover. This protects the contents from rain and dirt.

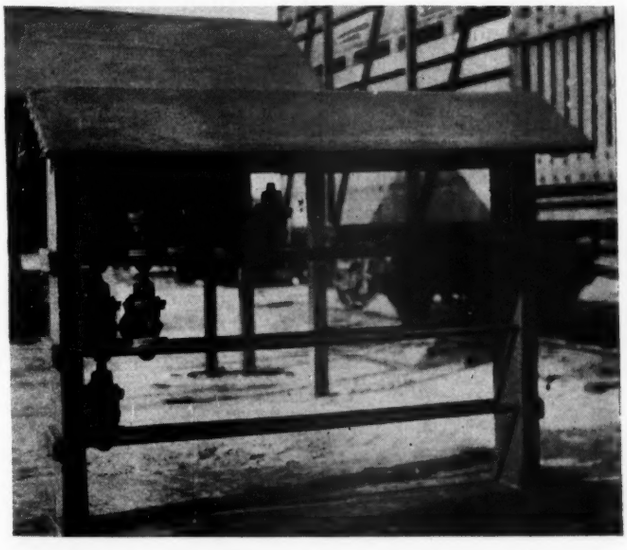
Directly in front of the drum container and over the wheel is a carrier or small platform for the dope bucket and packing iron. The amount of dope required for packing a box is removed from the drum when needed and placed in the bucket. The box is then packed from the bucket in the usual manner.



A wheelbarrow designed to prevent dope from falling out and to protect the contents from rain and cinders

Storage Rack For Triple-Valves

A STORAGE rack, located in a convenient place near the center of the car repair track will enable the air-brake repairmen to obtain triple valves more quickly than by going to the storehouse or air-brake shop every time one is needed. A receptacle, located along side of the storage rack, should be provided for the disposal of triple valves removed from cars and in need of cleaning or repairing.



A triple-valve storage rack located on the repair track

The size of the rack depends on the volume of work performed at the repair track. It can be so constructed that the various types of triple valves are segregated on shelves and the shelves can be stencilled to indicate the type so that material men can keep them properly sorted.

The supports are made from ¾-in. round iron so located as to permit the triple valves to rest in an upright position.

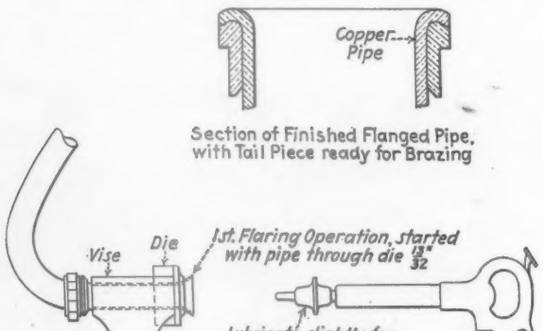
Stock should be replenished early each morning and if portable crane or truck service is available a supply of repaired valves can be returned from the air-brake shop or storehouse when the previous day's defective valves are delivered for cleaning or shipping.

In the Back Shop and Enginehouse

Flanging Injector Steam Pipes

MANY railroads are experiencing more or less difficulty with non-uniform hand methods of flanging the large copper pipes which supply steam to injectors. The generally-approved practice is to extend the copper pipe the required amount through a closely-fitting tailpiece, over which a flange is formed which makes a steam-tight joint when drawn up against the injector or cab turret by means of a large ring nut.

Where this flanging operation is done with a hand hammer, or mallet, even with a special face, repeated heating operations are usually required, and, in spite of the utmost precaution, it is difficult to avoid overheating the tailpiece, distorting or cracking it, and reducing the cross-section of the copper pipe where it fits over the tailpiece, with consequent possibility of cracking and failure. With a non-uniform flange thickness occasioned by hand methods, not only is the possibility of failure increased, but difficulty also is sometimes experienced in making the joint steam-tight. Moreover, tests have shown that repeated heating appreciably reduces the tensile strength of the original material in the copper pipe, itself.

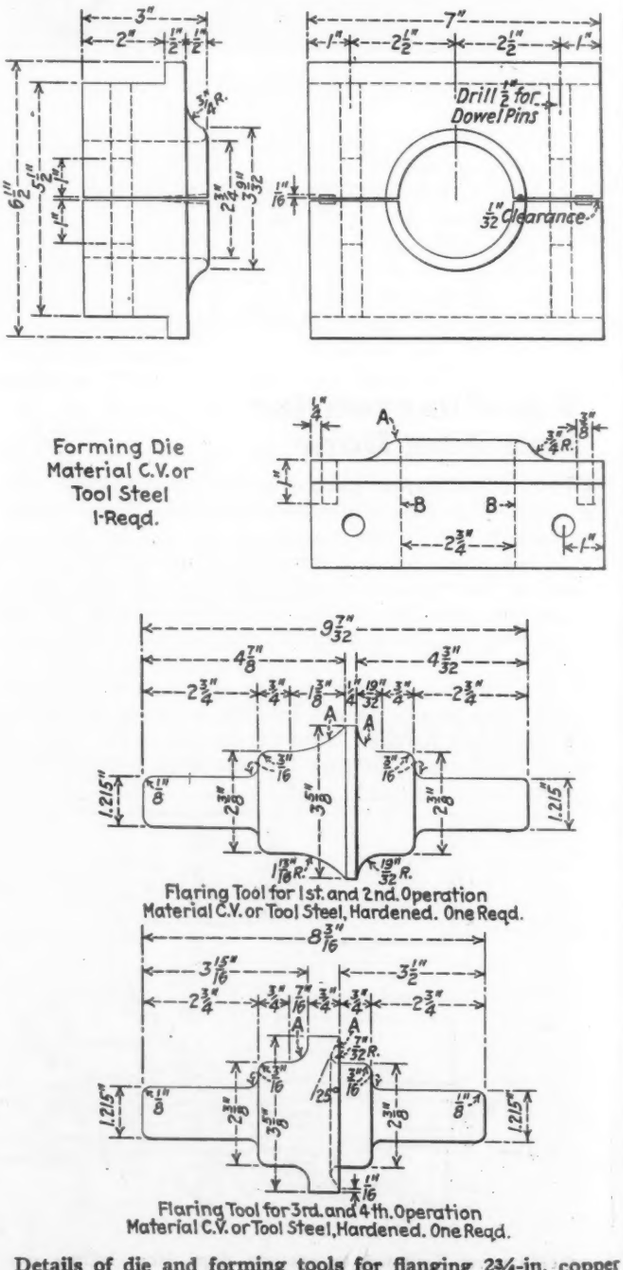


Method of flanging a copper injector steam pipe cold with the assurance of securing a reliable mechanical joint

Among other roads, the Illinois Central has been experimenting for a number of months in an effort to overcome these difficulties and produce a more uniformly reliable and safe injector steam-pipe joint with less expenditure of time and labor. The special die and forming tools, illustrated, have been developed, thoroughly tested and shown to produce a satisfactory flange, formed cold, and at a minimum cost. These tools are now being manufactured at a central tool-room for distribution to various shop and enginehouse points on the Illinois Central in order to assure uniformly satisfactory handling of this important detail of locomotive maintenance work.

The general method of operation in forming a flange with these tools is as follows: Referring to the general drawing, the copper pipe is supported in the two halves of a die rigidly clamped in vise jaws, with the nut and tail-piece drawn back out of the way so as to clear the jaws. The copper pipe is extended through the dies 13/32 in. for the first flaring operation, which is performed by one end of a forming tool, held in a No. 60 or No. 80 air hammer. The working face of the forming tool is lightly lubricated for the best results. The forming tool is reversed for the second flaring operation, and a second forming tool provides two additional operations.

The flanging of the copper pipe is, therefore, com-



Details of die and forming tools for flanging 2¾-in. copper injector steam pipes

pleted in four operations by using two ends or working surfaces on each of two forming tools.

After the flange is formed, the tailpiece is slipped in place and brazed with due precautions against overheating the copper pipe, the tailpiece or the spelter, which fills the counterbore. Burned borax is used for cleaning and the spelter is fine grain, about No. 20 mesh. Care is exercised not to build up the spelter on the pipe above the tailpiece. This entire operation can be performed in less than half the time required by hand methods and a far more uniform, safe job is assured.

Referring to the detail drawing, the construction of the die and forming tools will be observed. The die is a 3-in. block made of carbon vanadium, or tool steel, 7 in. square, machined to the shape shown, and sawed in two on the center line. Dowel holes are drilled before sawing in order to assure proper alinement, these dowels fitting freely in one half and being a tight fit in the other half. Spacing liners of approximately 1/32 in. in thickness for clearance are inserted before boring and finishing the pipe and flange contour. While seat *A* is highly polished to facilitate the flanging operation, the bored surface *B* is left slightly rough in order to assure the best gripping of the pipe.

The forming tools, made of carbon vanadium, or tool steel, hardened, are machined with the working surfaces *AA* of the shapes indicated and highly polished to assure the best results. In using these tools, the operator can tell by the feeling of the air hammer when each operation has been carried far enough, and will exercise care against overworking the material. This is particularly essential on the final flaring operation when there may be some temptation to hold the air hammer and forming tool against the flange too long. The dies and forming tools are made in 2¼-in. and 2¾-in. sizes.

Tire-Handling Clamps

By H. E. Tracy

THE handling of driving-wheel tires is greatly facilitated by the use of the clamps shown in the drawings. The use of a chain around the rim section, with consequent damage to the wheel-fit, and unsafe rope slings is eliminated.

The clamp shown in Fig. 1 is used for handling tires in a vertical position, as when placing into, or removing from, the wheel lathe. The clamp is lowered into position and hooked over the shoulder of the tire section, as shown. The slack in the crane chain is taken up, which secures the tire in the clamp. A safety wedge, which is secured to the back portion by a fire-door chain of suitable length, is dropped into place.

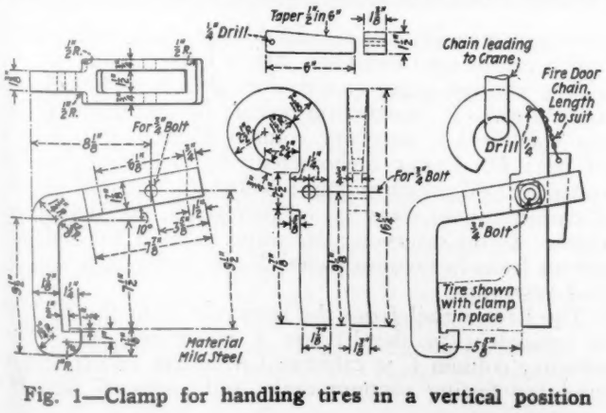


Fig. 1—Clamp for handling tires in a vertical position

The clamp shown in Fig. 2 is used for handling tires in a horizontal position, as when placing on, or removing from, the table of a boring mill. Two links made of ⅜-in. stock are secured to each clamp for lifting with a three-chain crane sling.

The clamps are lowered into position, as shown, and

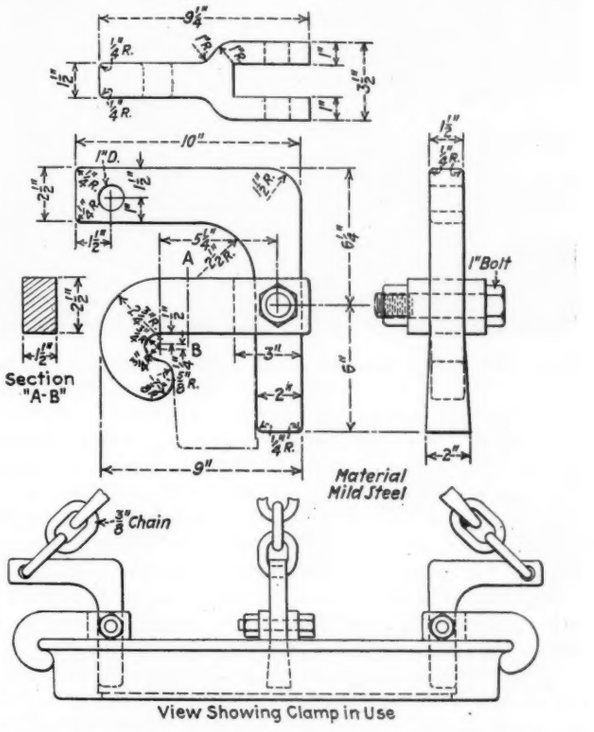


Fig. 2—Clamp for handling tires in a horizontal position

when the slack in the crane chain is taken up, the angle shaped part of the clamp bears on the wheel-fit of the tire and the hooked portion engages the flange, thus automatically clamping the tire.

Tinner Boosts Shop Efficiency

By J. M. Brophy*

SAFETY, speed and economy have been the results of a new idea in the rolling of stove pipe developed at the Burnside shops of the Illinois Central, Chicago. In the fall of the year, there is a demand for several thousand lengths of various sizes of stove pipe to be made for use over the system. The stove pipe is manufactured at Burnside shops and, in order to get this work, it is necessary for the shop to compete with outside manufacturers on the price. This we have been able to do by improving our machinery, which has speeded up the production.

The old-fashioned way of rolling stove pipe by turning a crank on the rolls over a period of eight hours was a tiresome task. This method has been discontinued by the application of a No. 2 air motor to the left side of the roller. Efficiency and production increased, but we found that while the mechanic was able to feed the rolls

* General foreman, Burnside shops. The present article is an abstract of one printed in the January Illinois Central Magazine.

Stove pipe rolling machine which produces 700 pipes an hour

with the material as fast as they were going, he could not remove the pipe after it had been rolled and keep up with the speed of the rolls. If he tried it, it was at the risk of cutting his hand on the sharp edges of the pipe. Then Theodore Schultz, tinner, designed a safety guard which he attached above the upper roller. It throws the pipe off the upper roller as soon as it is released and at the same time forms a shield so that the other end of the pipe will not be caught in one of the other rolls before it has cleared the machine.

The safety guard is made of 14-gage iron, 5 in. by 36 in., the length of the roller, and is curved to a radius of about 7 in. The guard has a bracket on each end and is secured to the bench so that the front edge of the guard rests directly on the top of the upper roller. The brackets are so arranged that the back edge of the guard will be 2 in. higher than its front edge. By arranging the guard in this manner, the stove pipe is thrown out of the roller automatically without the aid of a man's hands.

The power roller is on a bench about 30 in. wide and 30 in. high. In front of the roller, or at the edge of the bench, is placed a sheet-iron slide so that when the stove pipes are rolled they drop out of the roller and roll down the slide for the next operation. In improving the method in this manner, a man can roll 700 stove pipes per hour without any strain or effort. Under the old method of rolling by hand, 100 stove pipes per hour was the average rolled at this shop.

View showing details of sheet metal safety guard applied to top roll

Maintaining Rail-Motor Cars

By E. O. Whitfield

SHOWN in the three illustrations are testing devices considered essential to the maintenance of rail motor cars and a fixture for alining engine crankshafts. Referring to Fig. 1, the array of equipment, gages, etc., are for testing vacuum systems, carburetors, oil pumps, tachometers, oil-pressure gages, vacuum gages, vacuum pumps and similar equipment. In installing this testing equipment, actual operating conditions were simulated as closely as possible; such as height of lift, speed, etc.

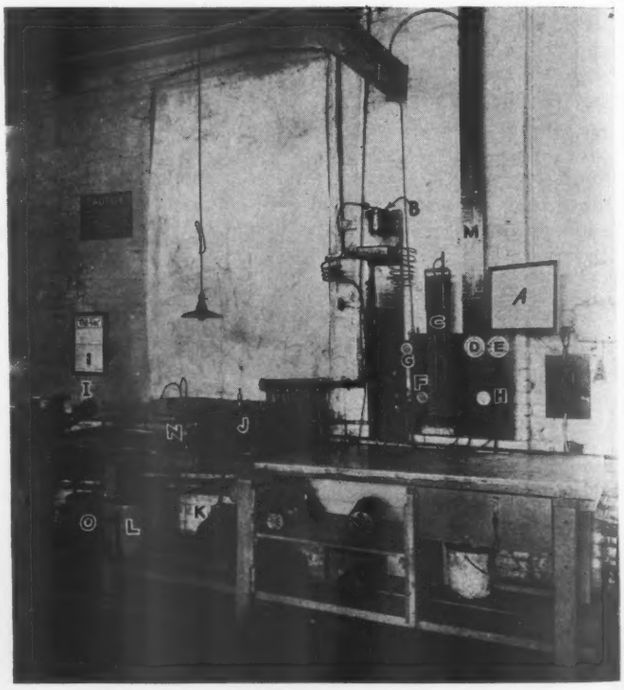


Fig. 1—Test bench for testing vacuum systems, gages and pumps

Power is provided by a variable-speed electric motor which can be operated from 200 to 1,800 r.p.m.

The various gages and devices shown in Fig. 1 are as follows: *A*, instruction board; *B*, vacuum tank inner chamber; *C*, mercury column calibrated in inches of lift; *D*, master tachometer; *E*, tachometer to be tested; *F*, oil-pressure gage; *G* and *H*, vacuum gages; *I*, carburetor on stand; *J*, oil pumps; *K*, variable speed motor; *L*, oil reservoir; *M*, water column for indicating air leaks in vacuum tanks; *N*, vacuum pump, and *O*, fuel reservoir.

The lift of fuel from the reservoir *O* to the tank *B* is equivalent to the lift on a rail-motor car. The mercury column *C* is calibrated in inches of lift and is used for testing vacuum tanks and gages, *G* and *H*.

Fig. 2—Engine being tested for oil tightness

The tachometers *D* and *E* are driven from a countershaft connected to the motor through the same type of gearing as that used on a car. The master tachometer *D* is used to test the tachometer *E* which has been removed from a car going through the shop.

The vacuum and oil pumps *N* and *J* are operated from the motor through countershaft and bevel-gear drives. The lift and pipe conditions similar to those encountered in actual operation are observed during the pump tests. Conditions of oil viscosity, comparable to actual operation and running temperatures, are observed and necessary adjustments made. The carburetor *I* is supplied with gas from a drip tank at vacuum pressures. The chamber *B* is used for testing float level and the tightness of float valves. The water column *M* consists of a glass tube to afford observation of air bubbles which indicate leaks in the vacuum system.

Instructions relative to the use of this equipment are

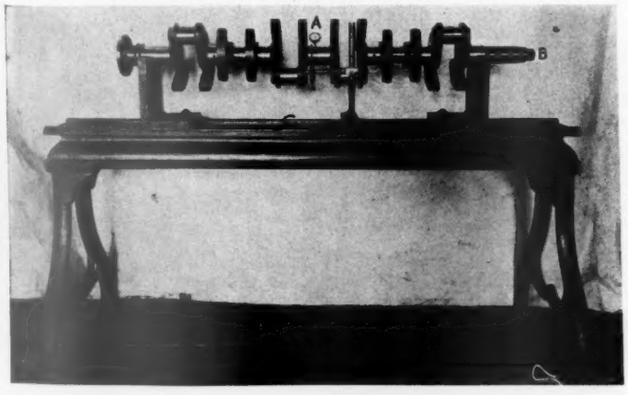


Fig. 3—Crankshaft being tested for alinement

shown on the chart *A*. All of the apparatus on this bench is set up to simulate actual operating conditions as far as possible and is designed to leave nothing to guesswork.

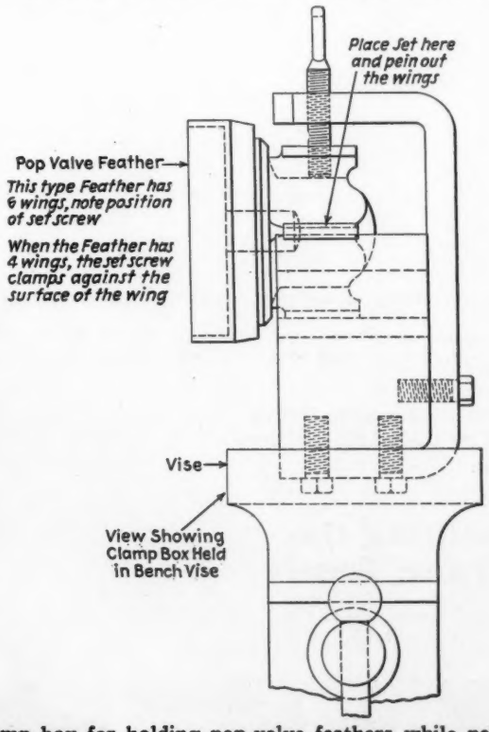
Fig. 2 shows an engine being subjected to an oil test to make sure that the main and rod bearings and piping are tight and are properly fitted. The reservoir is filled with five gallons of Polar Ice oil. Air pressure at 90 lb. is then turned into the tank. This pressure is then reduced to 60 lb., at which the by-pass valve is set. The oil is then fed to the engine at operating pressure. The crankshaft is slowly revolved to reveal any inaccuracies of alinement or defects in the bearings. The engine is mounted on a portable revolving stand and the oil is caught in the drip pan shown. This test shows up oil leaks at a time when they can be easily corrected.

Fig. 3 shows a crankshaft mounted on V-blocks to be tested for alinement. Referring to the illustration, *A* is a Universal indicator; *B* is the crankshaft, and *C* the test stand. The latter is made from a scrap lathe bed, on which the V-blocks are mounted. The indicator is attached to the stand and applied as shown. This illustrates the accuracy which must be observed to make effective repairs to internal-combustion equipment.

Peining Guide Wings Of Poppet-Valve Feathers

By E. G. Jones

THE clamp box shown in one of the drawings was designed for the purpose of obtaining some suitable device with which the guide wings of a pop-valve feather can be expanded neatly and safely. The old method of expanding these guide wings according to the recommended practice suggested by one of the manufacturers produces the desired results, but these results are not always a neat piece of workmanship and many workmen have experienced pinched and bruised fingers during this process. It is necessary to expand the guide wings before machining a pop-valve feather



Clamp box for holding pop-valve feathers while peining out their wings

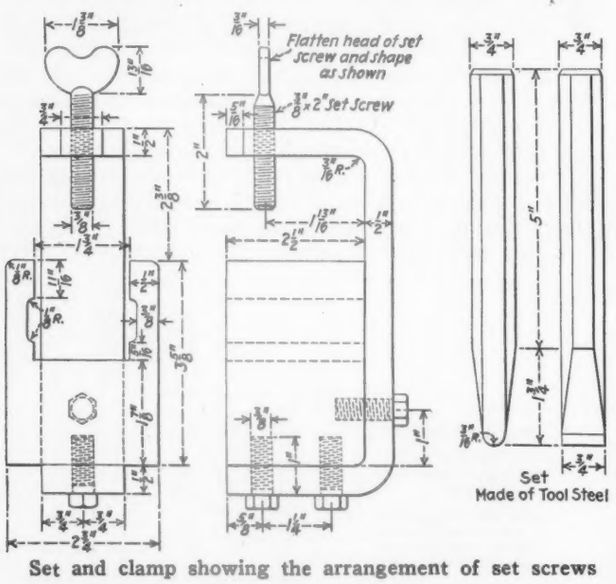
for reclamation, as these wings wear considerably. To maintain a clean working pop valve certain standards must be maintained, such as a neat fit between the guide wings and the body of the pop valve, thus the need for expanding the guide wings and machining a neat fit.

The feathers of the pop valves have either four or six guide wings. The clamp box is designed for both

types of feathers. The dimensions given here are for 3-in. pop valves only, but this style of clamp box can be adapted for other sizes by making other boxes with suitable dimensions.

The drawing shows a six-wing feather placed in the clamp box. The clamp screw clamps the feather to the box by bearing against the wing-guide body between the guide webs. When a four-wing feather is placed in the box the clamp screw will set against the surface of the wing guide and the feather will be clamped to the box as shown. The two wing guides, which are now in a horizontal position and resting on the top of the clamp box, can be expanded by striking a set, shown in the drawing, which is placed on top of the wing guide web. The feather is unclamped from the box, by turning the set screw, revolved and clamped again until all of the wing guides have been expanded. The feather is now ready for machining.

The clamp box is made of mild steel and a piece of ½-in. by 1½-in. flat iron is used as a set-screw bracket.

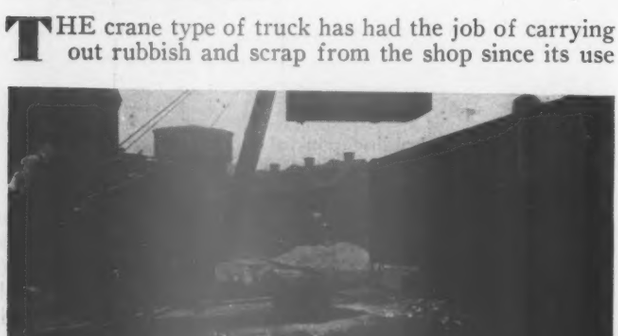


Set and clamp showing the arrangement of set screws

It is screwed to the box body by three ⅜-in. by 1-in. cap screws and placed so that it can be caught in the jaws of a bench vise. A ⅜-in. by 2-in. thumb set screw is used as a clamp screw. The expanding set tool is made of tool steel and has a round expanding end as shown.

Helping the Crane Truck

THE crane type of truck has had the job of carrying out rubbish and scrap from the shop since its use was first introduced in railroad shops because it can pick up the scrap or rubbish containers and carry them outside to the disposal point and dump the containers into cars without any unnecessary handling. Sometimes, however, the particular location of the side track where scrap or rubbish cars are switched to the shop yard is such that some crane trucks, especially those with the shorter booms, have difficulty in clearing the high sides of cars. That this difficulty may be easily overcome is shown in the illustration where an ingenious foreman has merely built an inclined runway up to the car side with enough elevation at the high end to enable the crane truck to clear the car side with its load.



An inclined runway helps the crane unload containers into high-side cars

Light Jib Crane For Punch Press

SHOWN in the illustration is a light jib crane which has proven useful, and in many instances saved the time of a helper, in the operation of the small punch press. The mast of the crane, made of 2½-in. pipe, is secured to the press by stirrup straps of ¼-in. by 3-in. steel. The end of the pipe fits over a 1-in. by 2-in. vertical stud, which is bolted to the top of the machine.

A jib crane of light construction is a useful facility for the operator of a small punch press

The top end of the mast, is pivoted in a channel-iron section secured to the roof structure.

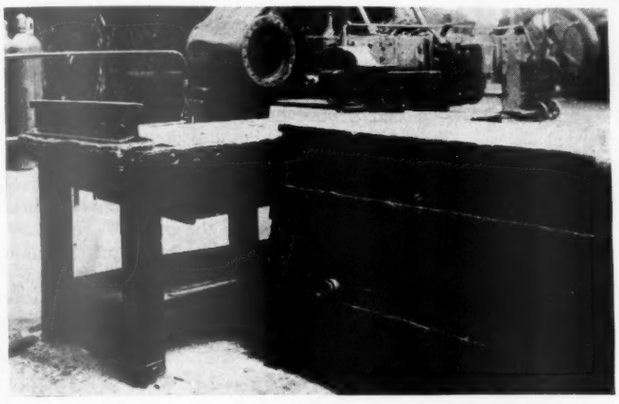
The arm is secured to the mast by means of a tee. It is turned up at the outer end, and a section of 1-in. angle iron is welded along the top of the arm to serve as a track for the trolley wheel. The outer end of the boom is braced to the top of the mast by a light iron rod.

The trolley pulley is made of three circular discs of steel, welded together. The two outer discs are made slightly larger in diameter than the middle disc to form the flanges of the wheel. The trolley wheel is carried on the vertical leg of the angle. The trolley-wheel

stirrup is of ¼-in. by 2-in. bar with an eye bolt at the lower end. Secured to this eye bolt, is a ¼-in. by 1½-in. bar 3 ft. long, which is punched with holes its entire length. An S hook is provided which can be inserted in any one of these holes to suit the height of the work, as shown in the illustration.

For Use Instead of a Vise

ON the shop or enginehouse work bench one of the handiest of all tools is the vise. So adaptable is it to a variety of uses that many men overstep the line and use it for purposes that it was never intended for. Almost anyone can recall the appearance of a vise that



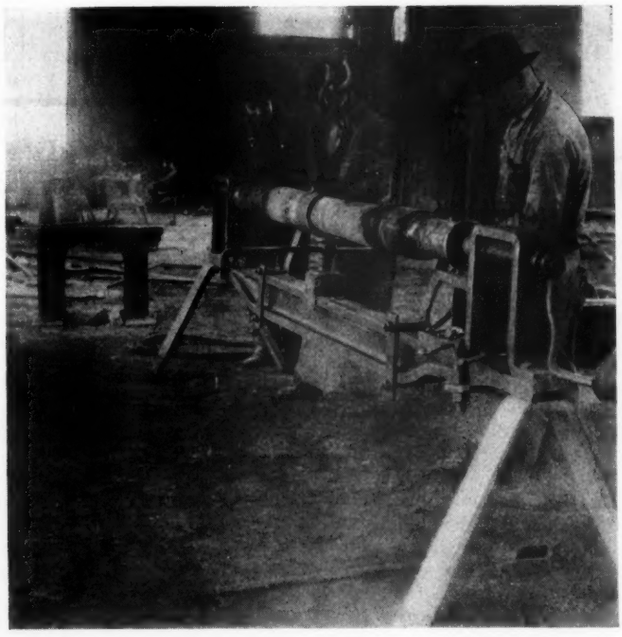
A short length of rail on a work bench makes a better anvil than a vise

has been used as an anvil by some mechanic or helper who should know better until the edges of the jaws have become so battered that they hardly serve the purpose for which they were originally intended. In one railroad shop the general foreman has had short lengths of rail fastened to work benches with instructions to use them as an anvil and save the vise for better uses.

Jacking Frame for Straightening Axles

THE frame shown in the illustration is used in the forge shop of a western road for straightening car axles. The base is made from a scrap locomotive main rod. The legs are of 1½-in. by 6-in. bar iron. The axle is mounted on two sections of 1½-in. pulley shafting, the ends of which have been turned down to spindle points to fit the countersink in each end of the axle. These spindles are supported in two brackets located as shown at each end of the base. The brackets are 16 in. high and are made of ¼-in. by 6-in. steel. The spindles are 18-in. long and are machined square at the outside end to take the crank handle. A collar is used to hold one spindle shaft in its bracket, while the opposite spindle shaft is threaded to screw into a large nut which is welded to the bracket. Screwing the threaded spindle shaft in the nut tightens the spindle points in the centers of the axle similar to the usual scheme used on a lathe.

Part of the base of the screw jack used is notched to fit the main rod as shown. The jack can be moved along the rod to any point desired under the axle. Bends are located by holding a soapstone pencil against the



Frame for straightening axles in the forge shop

axle. The pencil is held on one of two rests made from light bar, clamped to the base by two long bolts as shown. Loosening the nuts on the clamp bolts permits moving the pencil rests along the axle as desired. The axle is rotated by the crank on the spindle shaft which is not threaded.

PACIFIC 4-6-2.—The steam locomotive is, when all is said that can be said for other devices, about the most dramatic expression of hand and mind co-operation. It is a magnificent piece of craftsmanship. It is the noblest of articulated tools. It fills the whole demand of the imagination as a thing to ride on across the country. A horse is a great and mysterious thing and Job did not overdraw the picture of him, his neck clothed with thunder, pawing in the valley, the glory of his nostrils terrible. But this beast which stands here in the rain-streaked night on its 4-6-2 chassis, weighing 360,000 lb., this amazing simulacrum of life, breathing gently with its duplex air pumps, humming slightly at the safety valve, gleaming faintly on its polished sinews, a huge demonic figure condensed from the darkness, a djinni of the Arabian Nights tied to a string of 14 cars which it is prepared to drag in a furious rush to New Haven en route to New York and Washington—this beast, I say, is the most expressive symbol of the courage and craftsmanship of man since the clipper-ship era.—Atlantic Monthly.

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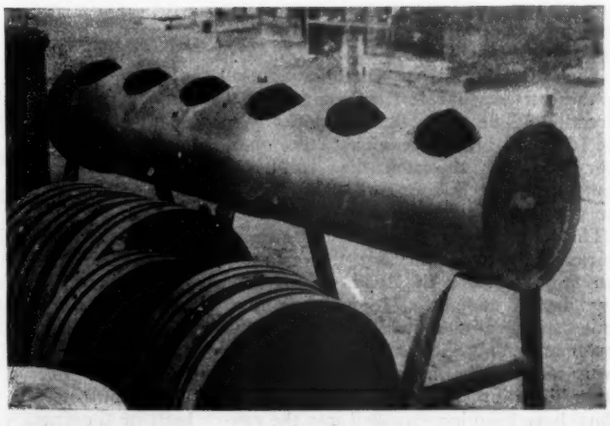


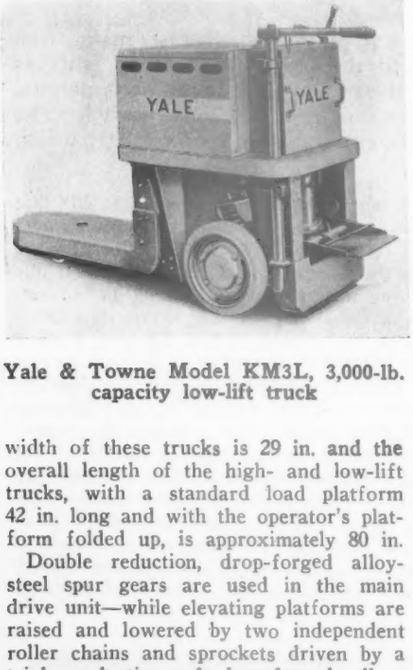
A scrap air tank with holes cut in the top and with welded partitions is useful for storing bolts, nuts and washers on the erecting floor

NEW DEVICES

Yale Midget Series Electric Trucks

The Yale & Towne Manufacturing Company, Philadelphia, Pa., has developed a complete line of midget trucks, known as the "KM Series." The illustration shows a model KM3L, 3,000-lb. capacity low lift truck. Other models include the 3,000-lb. high lift, and 4,000-lb. capacity low and high lift trucks having six wheel steer, a high- and low-platform load carrying type, as well as midget high lift fork trucks.

The light weight of these midget trucks with their capacity ratings of 3,000 to 4,000 lb., adapts them to operation where floors or elevator capacities are limited, or where operating space is restricted—requiring the truck to negotiate narrow aisles and congested areas. The overall



Yale & Towne Model KM3L, 3,000-lb. capacity low-lift truck

width of these trucks is 29 in. and the overall length of the high- and low-lift trucks, with a standard load platform 42 in. long and with the operator's platform folded up, is approximately 80 in.

Double reduction, drop-forged alloy-steel spur gears are used in the main drive unit—while elevating platforms are raised and lowered by two independent roller chains and sprockets driven by a triple reduction of drop-forged alloy-steel spur gears.

The Yale main drive controller as used in these trucks has four speeds in either direction. The controller interlocks with the driving brake, requiring the operator to return the controller handle to neutral after releasing the brake, before the power can again be turned on.

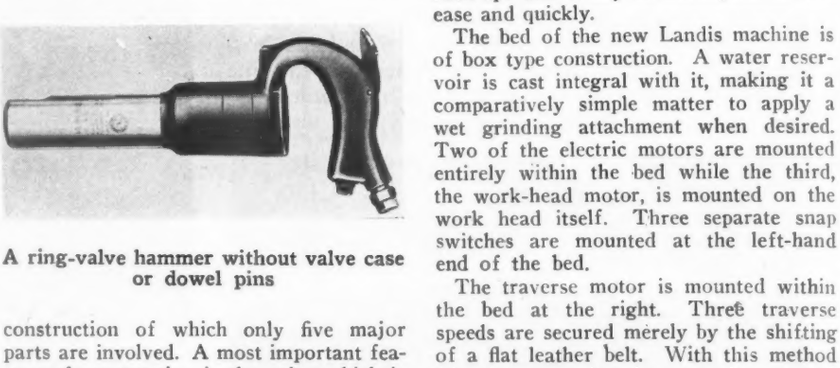
The controller on the high- and low-lift trucks is so arranged that the operator can stop or start the load platform at any desired height. Top and bottom limit stops automatically cut off the power and apply the brake when the platform reaches the maximum position in either direction. The automatic features which have been incorporated into the construction of the Yale & Towne "KM Series," trucks have been designed to facilitate easy and safe handling.

Ring-Valve Chipping Hammer

The Chicago Pneumatic Tool Company, New York, has recently introduced a line of ring valve chipping hammers in the

A ring-valve hammer without valve case or dowel pins

construction of which only five major parts are involved. A most important feature of construction is the valve which is a simple band ring placed over the end of the cylinder and having only 1/64 in. to 1/32 in. movement, depending on the size of the hammer. This construction permits the complete elimination of the valve case and dowel pins. Another feature is the use of a new locking device which automatically tightens the handle without the use of slots, bolts or lock washers. These hammers are made in five different sizes varying in weight from 11 to 13½ lb.



The parts of the ring-valve hammer

One of the illustrations shows the major parts of the hammer. From left to right the parts are: the metal guard; the cylinder; the ring valve; the piston, the walls of which are perfectly straight, not grooved and, at the extreme right of the illustration, the handle.

Landis Tool and Cutter Grinder

The Landis Machine Company, Waynesboro, Pa., has recently brought out a new tool-room grinder known as the Type B having a capacity of 12 in. by 32 in.

The controls of this machine have been carefully grouped and located for the convenience of the operator. Certain of these controls are dual and are located both at the front of the machine and to the rear at the left, thus enabling the operator to stand in either of these positions and sharpen cutters with equal ease. A unique type of work-table guide-way construction makes it possible to traverse the table with very little effort. Moving the work head or footstock, changing wheels, raising or lowering the wheel head, applying the various attachments and all such operations may be accomplished with ease and quickly.

The bed of the new Landis machine is of box type construction. A water reservoir is cast integral with it, making it a comparatively simple matter to apply a wet grinding attachment when desired. Two of the electric motors are mounted entirely within the bed while the third, the work-head motor, is mounted on the work head itself. Three separate snap switches are mounted at the left-hand end of the bed.

The traverse motor is mounted within the bed at the right. Three traverse speeds are secured merely by the shifting of a flat leather belt. With this method of motor mounting the motor is protected from dirt and moisture while, at the same time, it may be used to drive the water pump when the wet grinding attachment is supplied. The grinding wheel is driven by a motor mounted on the lower end of the column. This motor too is protected from dirt and moisture. The reversing of the two-step motor pulley will give a second grinding-wheel speed. Regardless of the position of the wheel head, the

Landis Type B 12-in. by 32-in. tool-room grinder

driving belt never runs in a twist, a feature which prolongs the life of the belt.

Duplex type preloaded wheel spindle ball bearings are used. The wheel head may be swiveled 90 deg. in either direction. A grinding wheel as large in diameter as 8 in. is supplied with standard

equipment. The work head may be swiveled in either a vertical or horizontal plane or may be used for dead spindle or live spindle grinding. The work head motor is mounted on a slotted plate making it an easy matter to maintain proper tension on the drive.

The machine is offered with plain equipment or with universal equipment. In addition, certain special equipment may be had. For example, a multi-speed work head and suitable footstock may be secured instead of the standard heads. Six work speeds are available with this heavier head but only a constant speed motor is used. A sturdy surface grinding head may be purchased extra when a large amount of surface-grinding work is to be performed.

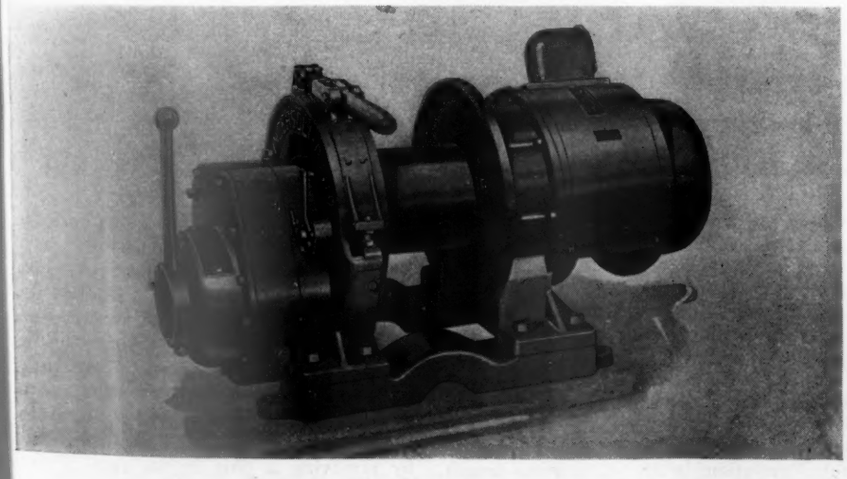
The weight of the plain machine, without electrical equipment, is 2,325 lb., the universal machine weighing 2,525 lb. without electrical equipment.

Ingersoll-Rand Electric Portable Hoist

The Ingersoll-Rand Company, 11 Broadway, New York, has added to its line of portable hoists a non-reversible, single-drum electric hoist. It is modeled after the company's "Utility" hoists, except that it uses an electric motor and friction clutch instead of an air motor and a jaw clutch.

The new hoist is suitable for all single cable work within its capacity such as hoisting timbers, tools, and pipe and for hauling and spotting cars. It is made in two sizes. No. 107 is of 7½ hp. and rated at 2,000 lb. pull at 125 ft. per minute. It has drum capacity for 400 ft. of ½-in. or 700 ft. of ⅜-in. cable. No. 107L is of like power, but has drum capacity for 800 ft. of ½-in. or 1,400 ft. of ⅜-in. cable. No. 110 has a 10-hp. motor and is rated at 2,000 pounds pull at 165 ft. per min. The drum capacity is the same as for the No. 107. No. 110L has the same power as the No. 110 and the same drum capacity as the No. 107L.

These hoists have smooth control and graduation of speed. They have a self-energizing brake for stopping and holding the load and an automatic safety drum lock for added safety when handling suspended loads. Moving parts are protected by dustproof construction. Bases are drilled and grooved for either column mounting or bolting to a flat surface. Either a.c. or d.c. motors can be furnished.

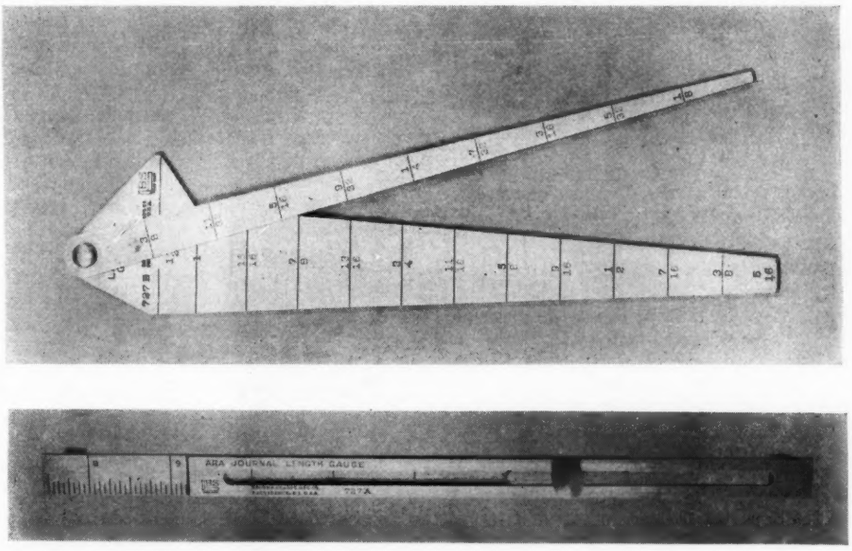


Ingersoll-Rand single-drum electric portable hoist

Brown & Sharpe Gages

The Brown & Sharpe Manufacturing Company, Providence, R. I., has recently developed two gages for railroad use known as the journal length gage, No. 727 A and the lateral gage No. 727 B. The No. 727 A is designed for checking the lengths of journals to determine whether or not they have reached the condemning limit. The gage is so constructed that it may be extended to the full authorized maximum length of 12⅝ in. as recommended by the American Railway Association.

The lateral gage, No. 727 B facilitates determining clearances in places not readily accessible, as lateral motion between hubs and journal boxes, between crossheads and guides, between wheel hubs and the main rod and in many similar places. The tapered blades, inserted between the parts, give the dimension at the point of contact. One blade measures from ⅛ in. to ⅜ in. by thirty-seconds and the other from 5/16 in. to 1 in. by sixteenths. The graduations are ½ in. or more apart so that smaller fractions of an inch can be estimated. The wide end measures 1½ in. All of the measuring surfaces are ground and the gage, shown in the illustration at the top, is cadmium plated and rust proof.



B. & S. lateral gage (above) and A. R. A. journal length gage (below)

Landis Hydraulic Universal Grinder

The Landis Tool Company, Waynesboro, Pa., has recently brought out a new hydraulic universal grinder for lighter production jobs of a great variety and for tool room work. An outstanding feature is the hydraulic table traversal which gives a range of table speeds from 6 in. to 144 in. per min. All of the mechanisms are easily accessible either for inspection or readjustment. The bed is of sturdy box type construction. The water reservoir is integral with it while the base in front forms a reservoir for the oil used by the hydraulic traversing system.

The work carriage traverses on a flat guide and a V guide with one vertical side. Alinement is thereby easily maintained. The size of the guides and their spacing is more than ample. Guide-way lubrication is of the flood type, filtered oil being used, and is supplied by the same pump which furnishes pressure for the hydraulic system.

The grinding wheel head is supported by a slide having a V and a flat guide with chilled surfaces. Steel-back babbitt-wheel spindle bearings are used. The

grinding-wheel spindle is driven at the right-hand end through a flat belt from an especially balanced motor mounted on top of the wheel base casting, at the rear. Control of the motor is from the front of the bed through the medium of a push button. Standard equipment includes both a 10 in. and 12 in. diam. wheel. The wheel head may be swiveled on its slide thus permitting the wheel to be set

Front view of the Landis hydraulic universal grinder

at various angles without influencing the direction of the feeding movement. These units are also mounted on a lower swivel which can be turned so as to feed the wheel in different directions.

The hydraulic system consists of a twin-cylinder type table traversing mechanism and a Tuthill internal-geared oil pump. Because of the use of twin cylinders (one for movement in one direction, the other for movement in the reverse direction) the volume of oil in them is constant regardless of the direction of the traversal. The control valve is located at the front of the machine where it governs the flow of oil from the end of one cylinder into the corresponding end of the other. Reversal takes place through the medium of a piston type valve. A constant speed motor drives the oil pump. Both the motor and the pump are attached at the rear of the bed, the motor being coupled to the water pump shaft by means of a flexible coupling. The water pump shaft extends entirely through the pump where it is again coupled to the oil pump shaft. Such an arrangement makes for simplicity as it eliminates the use of pulleys, belts, chains and sprockets.

A plain wheel feed is considered standard. Final movement is transmitted through a pinion and rack with a worm and worm gear arrangement at the rear of the feed-up arm. Back lash is taken up by a long compression spring located beneath the base and quite accessible. It is operated by a small piston at the rear of the automatic feed up hand wheel and functions at each reversal of the table. The design is such that it may be made to operate at one end or the other individually or at both ends.

A simple adjustment makes it possible to have the feeding in movement take place either just before or during reversal.

The headstock is driven by an individual constant speed motor which is controlled through a limit switch by the stop and start lever. A flat leather belt transmits the power from the motor to a jack shaft at the front of the base. From the jack shaft power is transmitted to the face plate also by means of a flat leather belt. Six work speeds are available by changing the pulleys and belts at the left-hand end of the head. The spindle may be made either live or dead and the nose of it is designed to receive chucks, face plates and such equipment. The base of the head is graduated and may be swiveled ninety degrees for face grinding.

A ball bearing type internal fixture is mounted on the front of the wheel head being driven by a flexible canvas belt from a pulley attached to the regular wheel spindle driving pulley on the motor.

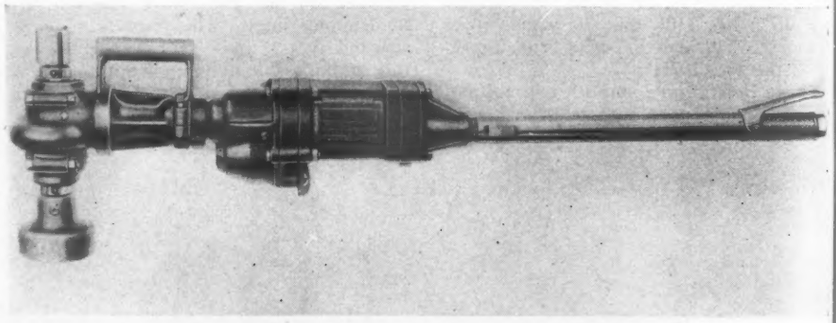
A hand reversing switch reverses the direction of the motor rotation for internal grinding.

The net weight of the machine, without electric motors but with all standard equipment, is 3,890 lb. All of the motors are of the constant speed type, the work drive being ⅓ hp., the pump drive ¾ hp. and the wheel spindle drive 1½ hp. The floor space required by the machine is 5 ft. 4 in. by 8 ft. 0 in.

Thor Rotary Pneumatic Wrench

A pneumatic wrench of the rotary type, that develops more power at a higher rate of speed, has been designed by the Independent Pneumatic Tool Company, 600 West Jackson boulevard, Chicago. Its uses in railroad shops, boiler shops, and machine shops, in putting on and removing a wide range of nuts, are numerous. It will remove 1⅛ in. cylinder-head nuts and all flexible staybolt caps.

An auxiliary handle of the swivel type is provided for the operator's assistant



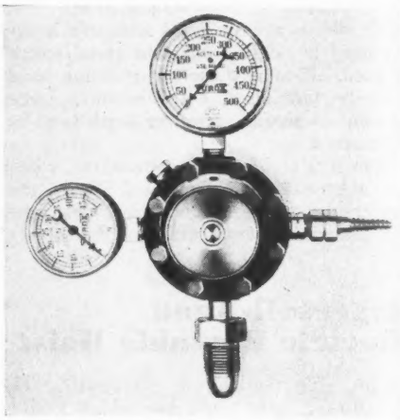
Thor No. 288 rotary pneumatic wrench

where the wrench is to be used in close quarters. Where space is unlimited, instead of the spade handle, the No. 288 wrench can be equipped with a right-angle head with lug, providing for an extension dead handle in line with the throttle handle.

The Thor 288 wrench is non-reversible and has a speed of 160 r.p.m. The length overall is 41½ in.; weight is 48 lb. The spindle offset, referring to the illustration, is 2⅛ in. and the length of the spindle is 9¾ in.

New Purox Regulators

The Linde Air Products Company, 30 East Forty-second street, New York, has recently introduced an entire series of new and improved Purox oxygen and acetylene regulators superseding its former line of Purox Metal Master type of regulators. All Purox welding or cutting outfits now include these new regulators



Purox No. 34 acetylene regulator

where formerly Metal Master regulators were supplied as part of the regulator equipment.

The new Purox series comprises six regulators, designated as No. 33 and 34 for acetylene; No. 13, 14, 23 and 24 for oxygen. All regulators in this series have the same general external appearance. They are of all-metal construction. The required volumes of oxygen and acetylene essential for maintaining a neutral flame at the blowpipe tip are delivered to the welding or cutting blowpipe at uniform pressure.

One of the outstanding design features of these regulators is an accurate self-alining valve of the nozzle and yoke type, insuring sensitive action and freedom from leakage. The type of construction eliminates any need of disturbing the diaphragm, bonnet, pressure adjusting screw, or pressure adjusting spring when replacing a worn valve seat. Access to the interior of the regulator is gained by removing a plug in the rear of the

(Turn to next left-hand page)

body. The seats are made of a material not easily marred, scratched or damaged by foreign particles that might find their way into the inside of the regulator.

The diaphragms are made of a special corrosion-resisting alloy. A rupturing disc safety release on the oxygen regulator provides protection to the diaphragm should an abnormal pressure occur. The operation of replacing the diaphragm is quite simple. The cap bolts are merely removed and the diaphragm and yoke lifted out. No special tools are required for this job.

Gages for the new regulators are of heavy construction in order to withstand the rough usage of field work. The cases are polished brass with beveled plate glass crystals. The working pressure gages are two in. and the cylinder pressure gages are constructed 2½ in. in diameter.

In accordance with the standard color specification for oxy-acetylene equipment, oxygen regulators are painted green and acetylene regulators red.

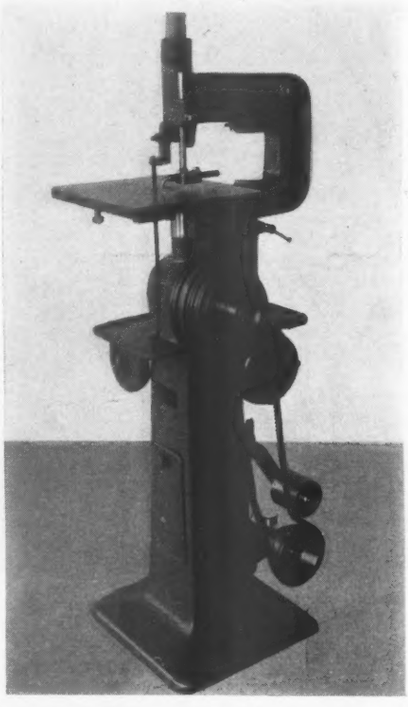
Precooler for Passenger Cars

A precooler for cooling the inside air of passenger cars while standing at terminals has been developed for the Metropolitan Ice Company, Boston, Mass., by the R. B. Engineering Corporation, 75 West street, New York. This precooler is designed with large refrigerating capacity with the object of lowering the temperature of a large quantity of air in a short time. It has a nominal capacity of 15 tons. The cooling effect is obtained by means of a water spray over the ice in the bunker. The cooling water is then circulated through radiators, similar to those commonly used in automobile construction.

A fan blower circulates air through the radiators and thence through an opening in the top of the precooler which is connected to an open window of the car by means of a portable duct. Power is furnished by a 1½ hp., 110-volt, a.c. motor. The fan blower is of the Sirocco type with shallow vanes. The water is circulated by means of a 1-hp. centrifugal pump.

Overarm Type Die-Making Machine

The Oliver Instrument Company, Adrian, Mich., has redesigned its pedestal type die-making machine, known as Model P-4, which eliminates the hold-down brackets, fingers and file rollers which were required with previous models. The model shown is a motor-belt-driven type, arranged for floor mounting and is equipped with V-belt pulley drive permitting five speeds.



Oliver Model P-4 die-making machine

This model is really a duplex machine, since it has special arrangements for holding light or heavy files and saws. Clamps are provided, attached directly to the reciprocating rams, which hold the heavy parallel files. These clamps also hold adjustable clamps for the smaller files and saws. These clamps are brought forward to simplify the process of inserting files and saws and they can also be adjusted vertically to permit the use of the shortest file or saw possible necessary to suit the thickness of the work to be completed on the machine.

The table of the new model is of heavy construction, rigidly supported on two brackets and tilts in four directions. The working surface is accurately ground and finished.

The overarm is used for both filing and sawing, the upper end of the file or saw being clamped to the ram, which reciprocates in ample and rigid bearings, or in the adjustable clamp referred to above. The upper ram is actuated through a bell-crank lever and two heavy coil springs which provide proper uniform tension on the saw. The overarm may be swung away from the file to remove the die for inspection and brought back to the same position instantly when filing is to be resumed. It is not necessary to remove the file or loosen it in the lower clamp to inspect the die. Hold-down fingers are attached directly to the overarm and the working surface of the table is entirely clear.

A saw magazine attached to the under side of the pan, which does not reciprocate, carries saw coils of various lengths which can be quickly adjusted for sawing out dies.

The P-4 model has a capacity for sawing tool steel up to 2 in. thick and will be found sufficiently large to meet the requirements of most shops. If desired, this machine can be furnished with variable stroke and mechanical feed. The features added to increase the ease of handling this machine include a screw-feed sawing attachment. It is rapid and accurate on both filing and sawing and saw breakage has been practically eliminated.

This model can be furnished for motor-belt drive or belt drive. This machine, shown in the illustration, weighs approximately 400 lb. and is driven by a one-half horsepower electric motor.

Tools for Fitting Superheater-Unit Joints

Elesco superheater units are attached to the superheater header by means of clamped metal-to-metal ball joints. Each unit end is machine-finished to form a true spherical surface which makes a line contact at the center of the 45-degree conical seat in the header. Extreme care is taken in manufacturing to obtain the correct contour of the ball ends of the superheater units and also the seats in the header.

The Superheater Company, New York, manufacturers of the Elesco superheater, has developed a set of tools for maintaining the accuracy of these joints which have demonstrated their practicability. These consist of four simple tools: unit ball-end grinding tool, unit ball-end facing tool with cutter, grinding tool for the unit seats in the header, and 45-degree

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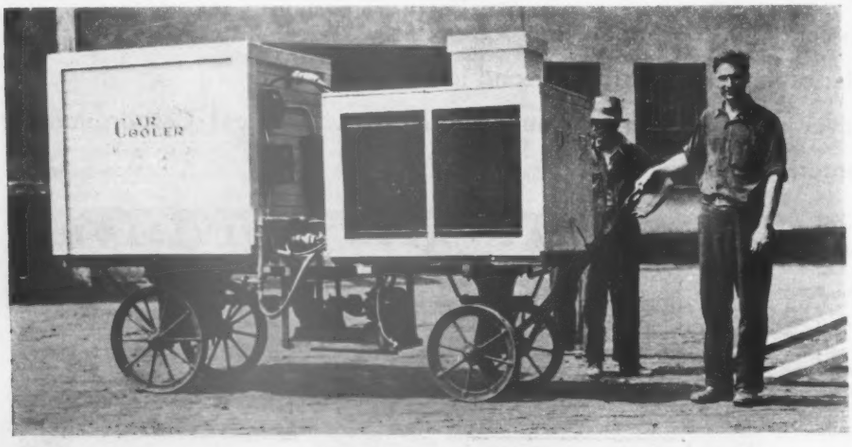
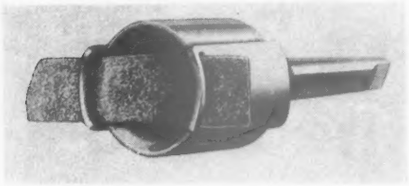


Passenger-car precooler

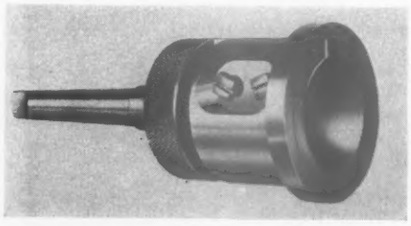
reamer for truing up the unit seats in the header.

The recess in the ball-end grinding tool which fits over the unit ball-end is a true sphere in form and maintains the exact contour given to the ball ends in their



Unit ball-end grinding tool

manufacture. The flexible aloxite cloth which does the actual grinding is held in place by the metal strips on either side of the tool. It cannot turn or come out while in use, and is easily renewed when worn.



unit ball-end facing tool with the cutter applied

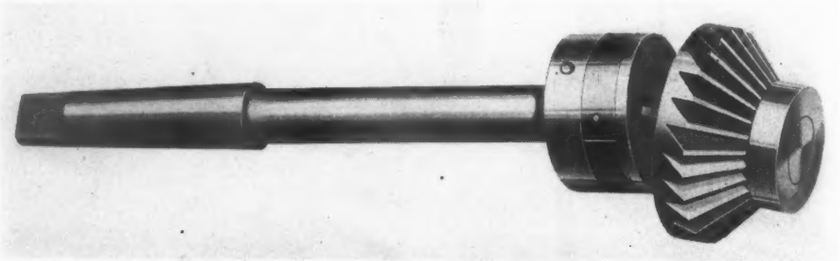
The unit ball-end facing tool is also extremely simple in construction, and, like the grinding tool, the bearing surface is of the correct contour. The cutter is adjustable and easily renewable. It is important that no more metal be removed than is absolutely necessary to true up the ball end. After the facing tool has been used, the grinding tool should always be used to give a perfectly smooth surface.

The grinding tool for the unit seats in the header is small and compact, and is provided with a ball-and-socket joint which enables the mechanic to grind the corner header seats without difficulty. It is shaped to a 45-degree angle and it is a very simple matter to cut the aloxite cloth to fit the grinding tool. This cloth is held in place on the tool by a nut which

Grinding tool for unit seats in the header

holds it securely and prevents it from turning on the tool.

The 45-deg. reamer for truing up the unit seats in the header is also provided with a ball-and-socket joint similar to the grinding tool for reaching the corner header seats. After this reamer has been used and the seat properly trued up, it should be followed by the grinding tool to obtain a smooth surface.



The 45-deg. reamer for unit seats in the header

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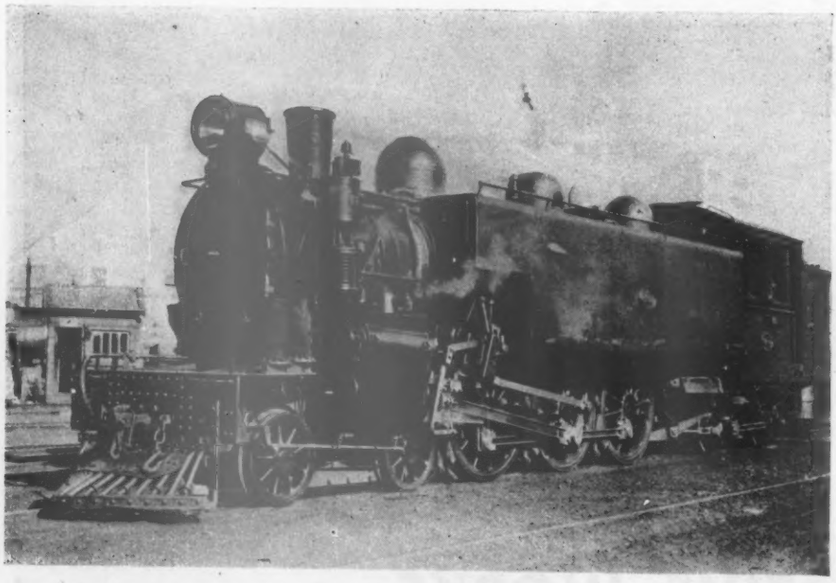


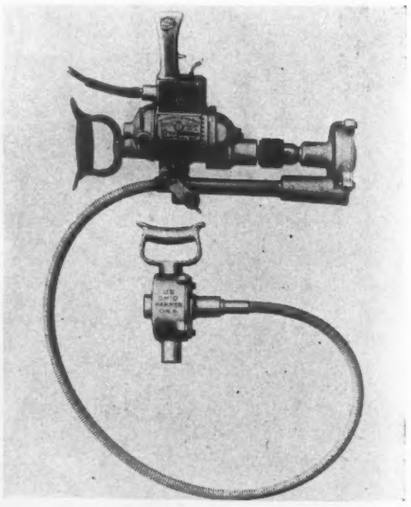
Tank locomotive used in heavy suburban service on the New Zealand Government Railways

These tools are all small in size, and are provided with a standard Morse taper shank of the correct size to fit a small air motor. When superheater units come from the factory, the ball ends make a true. steamtight joint with the header. By using these four tools very little effort will be required to maintain the joints in a standard condition.

Light Weight Electric Hammer

An electric hammer, weighing only 9 lb., is now being manufactured by the United States Electrical Tool Company, Cincinnati, Ohio. The light weight is made possible by operating the hammer through a flexible shaft attachment connected with any half-inch electric drill. In addition to the decrease in weight for a hammer of this capacity it is claimed that the flexible shaft prolongs the life of the tool by absorbing the destructive jarring otherwise imposed on the power unit.

This hammer strikes 4,000 blows a minute. The hammer member is made



A 9-lb. hammer which strikes 4,000 blows a minute

of the finest Swedish steel. Ball and roller bearings are used throughout in the construction of this hammer. The hammer and flexible-shaft connection are shown in the illustration.

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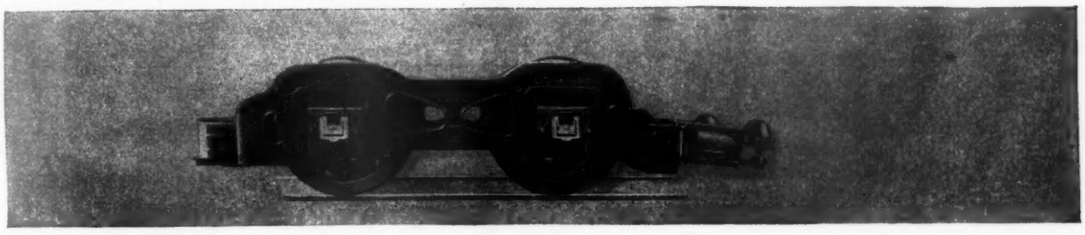
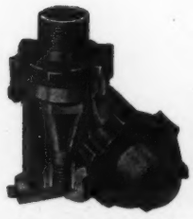
The Locomotive Booster



INCREASES THE MILES BETWEEN SHOPPINGS OF THE LOCOMOTIVE

● On roads where power is maintained in the best possible condition, it is found that the correct shopping mileage will vary according to the power transmitted thru the drivers. The locomotive with the least power thru the drivers attains the greatest economical mileage between shoppings of the locomotive. Booster designed engines giving power equivalent to non-Booster engines will require less power thru the drivers and at the slower speeds. This reduction in wear and tear results in greater mileage between shoppings for the Booster equipped locomotive. Increased mileage between shoppings means greater utilization and reduced investment expense for a given amount of work.



THE FRANKLIN SLEEVE JOINT

Does not become rigid under pressure

FRANKLIN RAILWAY SUPPLY CO., INC.

NEW YORK CHICAGO MONTREAL

Among the Clubs and Associations

CAR FOREMEN'S ASSOCIATION OF OMAHA, COUNCIL BLUFFS & SOUTH OMAHA INTERCHANGE.—The changes in the A.R.A. rules will be discussed at the meeting of the Car Foremen's Association of Omaha which will be held at 2 p. m. on February 11 at Omaha, Neb.

NORTHWEST CAR MEN'S ASSOCIATION.—The members of the Northwest Car Men's Association will discuss the A.R.A. rules at their meeting at 8 p.m. on February 15 at the Minnesota Transfer Y. M. C. A. Gymnasium building, St. Paul, Minn.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—At 10 a.m. on March 17 at the Ansley Hotel, Atlanta, Ga., the members of the Southern and Southwestern Railway Club will be addressed by Geo. V. Williamson of the International Correspondence Schools, Scranton, Pa., on the subject of The Counterbalancing of Locomotives.

EASTERN CAR FOREMEN'S ASSOCIATION.—"Correct Wheel Shop Practice" is the title of a paper to be presented by Wesley Dunbar, division car foreman of the Delaware & Hudson, at the February 26 meeting of the Eastern Car Foremen's Association which will be held at 8 p.m. at the Engineering Societies building, 29 West Thirty-Ninth street, New York.

PACIFIC RAILWAY CLUB.—A. L. Dobbs, assistant supervisor of air brakes, Atchison, Topeka & Santa Fe, and C. D. Stewart, district engineer, Westinghouse Air Brake Company, will speak on The Air Brake at the meeting of the Pacific Railway Club which will be held on Thursday, February 11, at 7:30 p.m. in the rooms of the Transportation Club, Palace Hotel, San Francisco, Cal. An open discussion from the floor will follow a formal discussion on air brakes and train handling.

CENTRAL RAILWAY CLUB OF BUFFALO.—The February 11 meeting of the Central Railway Club of Buffalo will be General Electric Night. The meeting will be at 8 p.m. in the ballroom of the Hotel Statler, Buffalo, N. Y., and will be under the direction of Walter J. Hedley, sales engineer, General Electric Company of New York. W. A. Gluesing, general engineering laboratory, General Electric Company, will explain "Adventures in Science," with demonstrations of laboratory apparatus to illustrate his remarks. W. S. H. Hamilton, assistant electrical engineer of the New York Central, will present a discussion of "Three Power Oil Electric Battery Locomotives on the New York Central," illustrated by "stills" and motion pictures. The meeting of the club to be held on March 10 will be under the auspices of the Baltimore & Ohio.

WESTERN RAILWAY CLUB.—The Western Railway Club will hold its next meeting, known as "Family Night," Monday evening, February 15, at the Hotel Sherman, Chicago. Following a "Dutch-treat" dinner at 6:00 p.m. sharp in the Bal Tabarin room, to which all members and guests of the club, as well as their families, are invited, the principal meeting at 8:00 p.m. will be addressed by Dr. Phillips Thomas, research engineer of the Westinghouse Electric & Manufacturing Co., on the subject "Electricity at Work and at Play." Many outstanding, but little understood, accomplishments in the modern electrical field will be explained and demonstrated with special apparatus in a clear and non-technical manner. The program will be of interest to members and guests of the club, and also to their families who are cordially invited to attend.

Club Papers

The New Interchange Rules

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Meeting held Monday evening, January 18, at the Auditorium hotel, Chicago. Subject, "Discussion of the New A.R.A. Rules." ¶ Changes in the new Interchange rules were considered under the leadership of J. E. Mehan, assistant to superintendent car department, Chicago, Milwaukee, St. Paul & Pacific, the discussion proceeding as far as Rule 17. A large part of the discussion centered around Rule 4, Section J, the consensus being that this section, as now worded, should make for important economies in car interchange practice. It is anticipated that under the present rule far less delay will be experienced in handling defective cars in interchange as, in the absence of complete carding of defects, it will no longer be necessary to switch cars to the repair track as a matter of protection.

From the R. F. & P. Bulletin

The only class of man not interested in the prosperity of the railroads—and he still rides them!

The Future of the Railways

WESTERN RAILWAY CLUB.—Meeting held Monday evening, January 18, at the Hotel Sherman, Chicago. Subject "The Future of the Railways," presented by Samuel O. Dunn, editor of the Railway Age and chairman of the Simmons-Boardman Publishing Company. ¶ That the field of federal railway regulation has been constantly broadened until the railways of the United States are now in practical effect being operated under two sets of managements was the principal theme of Mr. Dunn, who said: ¶ "The Interstate Commerce Commission is no longer merely a regulating body. It is exercising more and more of the power and performing more and more of the functions that are perogatives of management in other industries; and proposals are now being made for even increasing its present great authority. Most of the people of this country profess to fear the results of government management of the railways and say that we must spare no effort to avoid it. They overlook the fact that we already have a very large measure of government management; and the question as to whether the railroad problem can be solved is largely the question as to whether any industry can be successfully conducted under two managements, and if not, as to which management shall give way. ¶ "The solution of the great problem of reviving the art of railroad transportation will never be found until we find a way to stop something that has been going on for 25 years—that is, the decline in the percentage of return earned on railroad investment in every period of prosperity as compared with the return earned in the last preceding period of prosperity, and the decline in the percentage of return earned on investment in every period of depression as compared with the last preceding period of depression. ¶ "It is beyond question that investors furnished to the railway companies the capital invested during the last 11 years relying upon the assurance given in the Transportation act that they would be allowed to earn a fair return. They actually earned not the 5¾ per cent, but, during the entire period, an average of only 4.33 per cent on the commission's own basis of valuation, or $315,000,000 a year less than the commission held they

(Continued on next left-hand page)

needed and were entitled to. Consequently, investors have lost faith in railroad securities, the credit of the railroad industry has been largely destroyed, and it cannot be re-established and development of the art of railroad transportation revived without the most substantial evidence that the railways will be allowed to earn larger returns in the future. ¶ "In view of all the facts, it seems to me that what must be done to assure the future of the railways is not seriously debatable. There must be a continuance of efforts by manufacturers to develop and improve equipment, materials and supplies, and of railway officers to effect every practicable improvement and economy in service. There must be what Commissioner Eastman has described as 'a greater degree of co-operation on the part of railroad managements'. There must be a withdrawal of subsidies from competing means of transportation and application of comparable regulation to all carriers in order that there may be established equality of opportunity between them in competing for all traffic. There must also, however, be revolutionary changes in our federal regulation of railways, and to this end either the policy heretofore followed by the commission must be changed or its power must be reduced. ¶ "In its regulation of rates and in many other ways, the commission has actually become the manager of the railways of the United States. It not only determines the general level of rates, but the extent to which distance, and especially the legal provision regarding rates for long and short hauls, can be disregarded to meet the competition of coastwise steamships and carriers by highway and inland waterway. As long as these other carriers are free to make their rates as they please, the railways cannot meet their competition for traffic with rates that are established more and more on a distance basis and are constantly becoming more inflexible. The commission's policy has been not only to make the general level of rates too low, but also so to regulate them as to prevent the railways from meeting competition, and it has needlessly curtailed railway earnings in both ways. If the commission is to continue to exercise so much of the power of management of the railways, then it must assume the responsibility for its part in the management, and be held responsible for the results."

* * *

The "Daylight"—de luxe coach train of the Southern Pacific

Directory

The following list gives names of secretaries, dates of next or regular meetings and places of meeting of mechanical associations and railroad clubs:

AIR-BRAKE ASSOCIATION.—T. L. Burton, Room 5605 Grand Central Terminal building, New York.

ALLIED RAILWAY SUPPLY ASSOCIATION.—F. W. Venton, Crane Company, Chicago.

AMERICAN RAILWAY ASSOCIATION.—DIVISION V.—MECHANICAL.—V. R. Hawthorne, 59 East Van Buren street, Chicago.

DIVISION V.—EQUIPMENT PAINTING SECTION.—V. R. Hawthorne, Chicago.

DIVISION VI.—PURCHASES AND STORES.—W. J. Farrell, 30 Vesey street, New York.

DIVISION I. — SAFETY SECTION. — J. C. Caviston, 30 Vesey street, New York.

DIVISION VIII.—CAR SERVICE DIVISION.—C. A. Buch, Seventeenth and H. streets, Washington, D. C.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—G. G. Macina, 11402 Calumet avenue, Chicago.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. Thirty-ninth street, New York.

RAILROAD DIVISION.—Paul D. Mallay, chief engineer, transportation department, Johns-Manville Corporation, 292 Madison avenue, New York.

MACHINE SHOP PRACTICE DIVISION. — Carlos de Zafra, care of A. S. M. E., 29 West Thirty-ninth street, New York.

MATERIALS HANDLING DIVISION.—M. W. Potts, Alvey-Ferguson Company, 1440 Broadway, New York.

OIL AND GAS POWER DIVISION.—L. H. Morrison, associate editor, Power, 475 Tenth avenue, New York.

FUELS DIVISION.—A. D. Black, associate editor, Power, 475 Tenth avenue, New York.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eiseman, 7016 Euclid avenue, Cleveland, Ohio.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, 1315 Spruce street, Philadelphia, Pa.

AMERICAN WELDING SOCIETY.—Miss M. M. Kelly, 29 West Thirty-ninth street, New York.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Joseph A. Andrucetti, C. & N. W., Room 411, C. & N. W. Station, Chicago, Ill.

CANADIAN RAILWAY CLUB.—C. R. Crook, 2276 Wilson avenue, Montreal, Que. Regular meetings, second Monday of each month except in June, July and August at Windsor Hotel, Montreal, Que.

CAR DEPARTMENT OFFICERS ASSOCIATION.—A. S Sternberg, master car builder, Belt Railway of Chicago.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—G. K. Oliver, 2514 West Fifty-Fifth street, Chicago. Regular meetings, second Monday in each month except June, July and August, Auditorium Hotel, Chicago, Ill.

CAR FOREMEN'S CLUB OF LOS ANGELES.—J. W Krause, 608 South Main street, Los Angeles, Cal. Meetings second Monday of each month except July, August and September, in the Pacific Electric Club building, Los Angeles, Cal.

CAR FOREMEN'S ASSOCIATION OF OMAHA, Council Bluffs and South Omaha Interchange.—Geo. Kriegler, car foreman, Chicago, Burlington & Quincy, Sixteenth avenue and Sixth streets, Council Bluffs, Iowa. Regular meetings, second Thursday of each month at Council Bluffs.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS.—Jos. F. Brady, 4036 Scanlon Place, St. Louis, Ill. Regular meeting first Tuesday in each month, except July and August, at American Hotel Annex, St. Louis, Mo.

CENTRAL RAILWAY CLUB OF BUFFALO.—T. J. O'Donnell, executive secretary, Room 1817, Hotel Statler, Buffalo, N. Y. Regular meeting, second Thursday each month, except June, July and August, at Hotel Statler, Buffalo.

CINCINNATI RAILWAY CLUB.—D. R. Boyd, 2920 Utopia Place, Hyde Park, Cincinnati, Regular meeting, second Tuesday, February, May, September and November.

CLEVELAND RAILWAY CLUB.—F. B. Frericks, 14416 Alder avenue, Cleveland, Ohio. Meeting second Monday each month, except June, July and August, at the Auditorium, Brotherhood of Railroad Trainmen's building, West Ninth and Superior avenue, Cleveland.

EASTERN CAR FOREMEN'S ASSOCIATION.—E. L. Brown, care of the Baltimore & Ohio, Staten Island, N. Y. Regular meetings fourth Friday of each month, except June, July, August and September.

INDIANAPOLIS CAR INSPECTION ASSOCIATION.—P. M. Pursian, 823 Big Four building, Indianapolis, Ind. Regular meetings first Monday of each month at Hotel Severin, Indianapolis, at 7 p.m. Noon-day luncheon 12:15 p.m. for Executive Committee and men interested in the car department.

INTERNATIONAL RAILROAD MASTER BLACKSMITH'S ASSOCIATION.—W. J. Mayer, Michigan Central, 2347 Clark avenue, Detroit, Mich.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. T. Winkless, Room 707, LaSalle Street Station, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—William Hall, 1061 W. Wabash street, Winona, Minn.

MASTER BOILERMAKERS' ASSOCIATION. — A. F. Stiglmeier, secretary, 29 Parkwood street, Albany, N. Y.

MASTER CAR BUILDERS' AND SUPERVISORS' ASSOCIATION.—See Car Department Officers Association.

NATIONAL SAFETY COUNCIL—STEAM RAILROAD SECTION.—W. A. Booth, Canadian National, Montreal, Que. William Penn and Fort Pitt Hotels, Pittsburgh, Pa.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic avenue, Boston, Mass. Regular meeting, second Tuesday in each month, excepting June, July, August and September. Copley-Plaza Hotel, Boston.

NEW YORK RAILROAD CLUB.—Douglas I. McKay, executive secretary, 26 Cortlandt street, New York. Meetings third Friday in each month, except June, July and August, at 29 West Thirty-ninth street, New York.

NORTHWEST CAR MEN'S ASSOCIATION.—E. N. Myers, chief interchange inspector, Minnesota Transfer Railway, St. Paul, Minn. Meeting third Monday each month, except June, July, and August, at Minnesota Transfer Y. M. C. A. Gymnasium building, St. Paul.

PACIFIC RAILWAY CLUB.—W. S. Wollner, P. O. Box 3275, San Francisco, Cal. Regular meetings, second Thursday of each month in San Francisco and Oakland, Cal., alternately.

PUEBLO CAR MEN'S ASSOCIATION.—I. F. Wharton, chief clerk, Interchange Bureau, Pueblo, Colo.

RAILWAY BUSINESS ASSOCIATION. — Frank W. Noxon, 1124 Woodward building, Washington, D. C.

RAILWAY CAR MEN'S CLUB OF PEORIA AND PEKIN.—C. L. Roberts, R. F. D. 5, Peoria, Ill.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 1841 Oliver building, Pittsburgh, Pa. Regular meeting fourth Thursday in month, except June, July and August, Ft. Pitt Hotel, Pittsburgh, Pa.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett. Baltimore & Ohio, Baltimore, Md.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver building, Pittsburgh, Pa. Meets with Mechanical Division and Purchases and Stores Division, American Railway Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, M. P. O. Drawer 24, St. Louis, Mo. Regular meetings, second Friday in each month, except June, July and August.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. T. Miller, P. O. Box 1205, Atlanta, Ga. Regular meetings third Thursday in January, March, May, July, September and November. Annual meeting third Thursday in November, Ansley Hotel, Atlanta, Ga.

SUPPLY MEN'S ASSOCIATION. — E. H. Hancock, treasurer, Louisville Varnish Company, Louisville, Ky. Meets with Equipment Painting Section, Mechanical Division American Railway Association.

TORONTO RAILWAY CLUB.—J. A. Murphy, Box 8, Terminal "A," Toronto, Ont. Meetings third Monday of each month, except June, July and August.

TRAVELING ENGINEERS' ASSOCIATION. — W. O. Thompson, 1177 East Ninety-eight street, Cleveland, Ohio.

WESTERN RAILWAY CLUB.—J. H. Nash, 343 South Dearborn street, Chicago. Regular meetings, third Monday in each month.

NEWS

Domestic Orders Reported During January, 1932

Passenger Cars

Name of Company	Number Ordered	Type	Builder
Reading Company	28	Multiple-unit coaches	Bethlehem Steel Co.
	2	Multiple-unit passenger and baggage	Bethlehem Steel Co.
Total for month	30		

Freight Cars

Name of Company	Number Ordered	Type	Builder
Northern Pacific	150	Hopper	Pressed Steel Car Co.
North American Car Corp.	9	Tank	American Car & Fdy. Co.
Total for month	159		

PASSENGER TRAINS on the Long Island Railroad, for the year 1931, made a record of 99.8 per cent on time; and in March, April, June and October the record was 99.9. This, say the officers of the road, may be safely claimed as a world's record, the number of trains operated being regularly between 25,000 and 30,000 a month.

DURING February and March as in January, the principal shops of the Canadian National will operate on a five-day week for three weeks of each month, commencing with the first Monday of every month. The personnel concerned number about 10,000 men. Previous to the beginning of this year the shops had been on a 36-hour week and the new time arrangement of forty hours per week for three weeks each month brings about a reduction of approximately four days per month in working time.

Cars and Locomotives Awaiting Repairs

CLASS I RAILROADS on January 1 had 6,990 locomotives in need of classified repairs, or 13 per cent of the number on line, according to reports filed by the carriers with the Car Service Division of the American Railway Association. The roads also on January 1 had 10,982 serviceable locomotives in storage, compared with 10,290 on December 15.

There were also 187,666 freight cars in need of repairs, or 8.7 per cent of the number on line. This was a decrease of 6,734 cars below the number in need of repair on December 15, at which time there were 194,400 or 8.9 per cent. Freight cars in need of heavy repairs on January 1 totaled 141,333 or 6.5 per cent, while freight cars in need of light repairs totaled 46,333 or 2.2 per cent.

The Bermuda Railway

FACED with the problem of providing some means of mechanical transport for a resident population of 32,000, plus large numbers of tourists, but unwilling to lift the legal ban in existence since 1908 on automotive highway vehicles, the government of the British crown colony of Bermuda authorized, a few years ago, the construction of a railway. Although original plans contemplated completion of the project during the spring of 1928 at a cost of about $2,000,000, Bermuda Traction, Ltd. (now the Bermuda Railways Investment Co., Ltd.), organized under the terms of the Bermuda Railway Act to build the new line, found considerable difficulty in obtaining necessary land at reasonable prices, with the result that actual construction was long delayed and total cost materially increased. These difficulties being finally overcome with government assistance, the western section of the line, from Hamilton to Somerset, was formally opened to traffic on October 31, 1931, at which time the eastern branch was also near completion.

As built under contract by Balfour, Beatty & Co., Ltd., the new 22-mile railway serves the entire length of the main islands, from Hamilton, the centrally-located capital, west to the British naval base at Somerset, 11 miles, and east to St. George, also 11 miles. The single track is of standard 4-ft. 8½-in. gage, and is laid with 67½-lb. rail on timber crossties.

All traffic is to be handled by rail motor cars; six for passengers and two for freight, together with an equal number of trailers for each class of service having been supplied by the Drewry Car Co., Ltd. Each passenger motor car, weighing 20 tons, accommodates 16 first- and 26 second-class passengers on reversible upholstered or wooden seats, while the trailers, all first-class, weigh 14 tons and seat 40 passengers in individual arm chairs. The cars are mounted on steel underframes carried on four-wheel trucks, those bearing the power units being interchangeable so that during overhauls a spare stand-by unit may be substituted, making it unnecessary to withdraw the coach from service. Parsons 6-cylinder 4¾-in. by 6-in. engines, with a continuous rating of 120 hp. at 1,650 r.p.m., supply the motive power, which is applied to the trucks by a straight-line transmission; while the Wilson-Drewry epicyclic preselective gear box, giving five speeds both forward and reverse, is used for the first time in railway service. This gear, which has shown about 99 per cent test efficiency makes it possible to reduce the pneumatically-operated control to its simplest form and to provide automatic engagement of gears at a constant rate under all conditions. Electric lighting, electric self-starters and air and hand brakes are also standard.

Shops equipped to make either running repairs or complete overhauls of all rolling stock are located at Hamilton.

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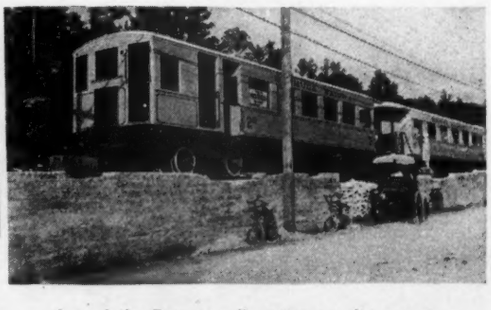
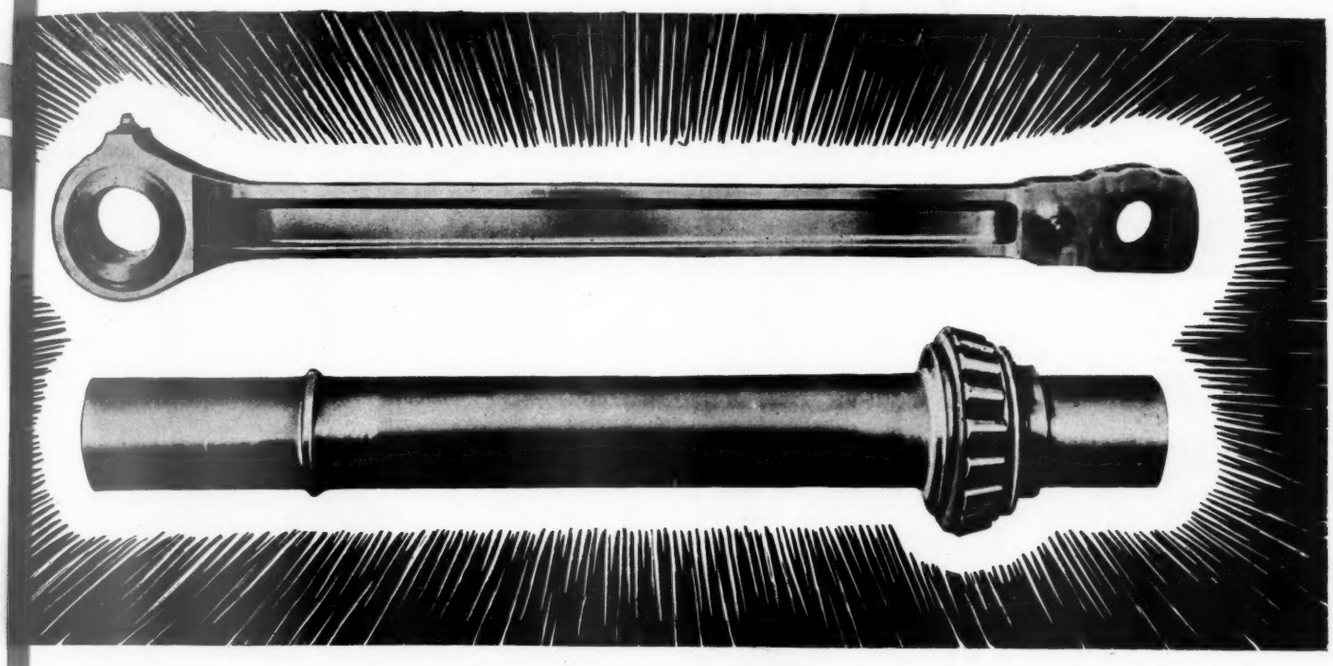
Typical station and track construction at Elbow Beach, one of the many less important points where passing sidings and instrument boxes for control of traffic in adjacent sections are not provided.

A construction view, showing progress on a cut through the coral rock which is the principal geological formation of the Bermuda Islands.



One of the Drewry rail motor cars for passenger service, with first-class trailer attached. Bicycles and horse-drawn carriages were Bermuda's only means of transportation before the construction of the railway.



FORGINGS
ON THE TIMKEN LOCOMOTIVE

WHEN Timken specified the forgings for this noteworthy locomotive it demanded the best of everything. And why not? Timken had more at stake than the money invested in this locomotive. Timken wanted to prove a new principle of design of far reaching importance. The success of the entire enterprise depended on reliable locomotive performance. It had to be good. Nothing was left to chance.

Alco axles, side rods, crank pins and piston rods were selected—because they have demonstrated their worth on thousands and thousands of locomotives. Their strength, uniformity and durability was a vital factor in the locomotive's splendid performance on its first 100,000 miles of service.

Alco Forgings are precision built, not only precise in every dimension, but precise in every phase of manufacture. Each billet is first inspected for physical soundness and correct chemical properties. The forging and heat treating temperature is fixed by the laboratory and assured by pyrometer control. The 1,000-ton forging press presses the forgings from the heated billets, working the steel thoroughly, thereby producing stronger forgings of finer texture. The forgings are again heat-treated to get the best in grain refinement, ductility and tensile strength.

When you purchase Alco Forgings you get quality all ways—always in design, materials and workmanship. There is no compromise between what is merely acceptable and what is the best obtainable.

American Locomotive Company
30 Church Street New York N.Y.

Supply Trade Notes

MARK C. BATES, a director of the Ryan Car Company, Chicago, has been elected vice-president.

THE STANLEY H. SMITH COMPANY has been appointed railroad sales agent at Cleveland, Ohio, for The Gardner-Denver Company, Quincy, Ill.

WILLIAM H. WAITE, representative of the Browning Crane & Shovel Co., Cleveland, Ohio, with headquarters at New York, has been appointed sales manager, with headquarters at Cleveland.

THE INDUSTRIAL BROWNHOIST CORPORATION, Cleveland, Ohio, has moved its general offices to Bay City, Mich., but will maintain a district sales office at 4403 St. Clair avenue, Cleveland, Ohio.

HENRY H. TIMKEN, JR., assistant works manager of The Timken Roller Bearing Company for the past two years has been appointed assistant to the president of The Timken Steel & Tube Company, Canton, Ohio.

THE RAILROAD MATERIALS CORPORATION, 30 Church street, New York, has been appointed railroad representative for the Electric Arc Cutting & Welding Company, Newark, N. J., manufacturers of electric welding equipment and welding rods.

C. A. CROFT, representative in the railroad division of the A. M. Byers Company, Pittsburgh, Pa., has been appointed resident railroad representative in the newly established office of the company at 1689 Arcade building, St. Louis, Mo.

J. R. C. HINTZ has been appointed district manager, railway sales department, Detroit Graphite Company, with headquarters at 386 Fourth avenue, New York. Mr. Hintz was formerly with the Detroit Graphite Company as railway sales representative and later joined Benjamin Moore & Company, New York, in the same capacity.

THE HOPKINS COMPANY, Chicago, has completed an arrangement with the Massey-Harris Company, Racine, Wis., to handle the railroad sales of the latter company's general-purpose four-wheel-drive tractor with all railways having purchasing agents at Chicago, Detroit, Mich., Cleveland, Ohio, and Cincinnati, St. Louis, Mo., Omaha, Neb., Dallas, Tex., and Houston.

THE SALE of the Railroad Supply Company, which was to have taken place on January 11 at Chicago, has been postponed until February 8, by Federal Judge Garfield Charles of the district court at Chicago. The Railroad Supply Company filed a voluntary petition of bankruptcy on October 27, and on the same day the federal court appointed Fred E. Hummel receiver.

THE PHILIP CAREY COMPANY, Cincinnati, Ohio, has made arrangements with the American Hair & Felt Company, Chicago, for the sale of its products to railroads and railroad equipment companies through the latter concern under the direction of James C. Younglove, general manager, transportation and government division, American Hair & Felt Company and the Dry Zero Corporation, with headquarters at Chicago.

R. A. CLARK now represents the Baker-Raulang Company, Cleveland, Ohio, in the New England states, with headquarters in the Park Square building, Boston, Mass. Frank E. Witte, with headquarters at 1061 Howard street, San Francisco, Cal. and H. S. Fuller, with headquarters in the Terminal Sales building, Seattle, Wash., are now in charge of sales and service on the Pacific Coast.

WILLIAMS, WHITE & COMPANY, Moline, Ill., have acquired the assets and good will of the Rock River Engineering Works, Janesville, Wis., and will continue to manufacture its line of bending rolls, hydraulic straightening presses and hydraulic molding presses. G. H. Case, former owner and manager of the Rock River company, will be associated in the future with Williams, White & Co.

JAMES H. DREW has opened an office in the Midland Bank Building, Cleveland, Ohio, and will represent the Westinghouse Electric & Manufacturing Company in the sale of line material and rail bonds in the states of Kentucky, Ohio, Indiana, Illinois and Michigan. He will also represent other manufacturers of products used by steam railways, electric railways and motor bus equipment.

J. D. HARRISON, district manager of the Chicago office of the Combustion Engineering Corporation, New York, from 1922 to 1929, has been reappointed to that position, with office in the Bankers building, Adams and Clark street, Chicago. Mr. Harrison succeeds Hugh R. Carr, who has been transferred to the sales department of the home office at New York, as manager of stoker sales.

THE WELDING ENGINEERING COMPANY, 2872 North Forty-first street, Milwaukee, Wis., now represents Lukenweld, Inc., Coatesville, Pa., a division of Lukens Steel Company in the state of Wisconsin, and Marvine Gorham, Jackson building, Buffalo, N. Y., represents Lukenweld, Inc., in the Buffalo territory, including Erie county, Pa., and New York state from the western boundary to Utica.

WILLIAM E. UMSTATTD is now executive vice-president of the Timken Roller Bearing Company, Canton, Ohio. Mr. Umstattd has been with the Timken organization for 13 years, during the last two years of which he was factory manager.

CARL H. BECK has been appointed eastern manager of the Westinghouse Air Brake Company, with headquarters at New York, to succeed H. B. Gardner, deceased. Mr. Beck was graduated from the Pennsylvania State College in 1905 with a B. S. degree and in 1911 received his M. E. degree from the same college. He entered the employ of the Westinghouse Air Brake Company as a special

Carl H. Beck

apprentice in 1905, and after filling special shop and field assignments was transferred to the St. Louis office in 1907, serving as steam road inspector. In 1909 he was promoted to representative for the Westinghouse Traction Brake Company in the same city, which position he held until 1919 when he was made special representative of the Safety Car Devices Company, at Wilmerding, Pa. In 1920 Mr. Beck was appointed assistant eastern manager of the Westinghouse Air Brake Company. In July, 1927, he was appointed general sales manager of the company, with headquarters at Wilmerding. This position was temporarily discontinued in May, 1931, and Mr. Beck returned to New York as a special representative. He now assumes responsibility of the eastern district with the title of eastern manager.

COL. R. H. MORSE, who has been elected president and general manager of Fairbanks, Morse & Co., was born at Chicago on December 6, 1878, and in 1895 entered the employ of Fairbanks, Morse & Co., the firm founded by his father, C. H. Morse. Here he began his career with the company as an apprentice at the Beloit factory (then known as Fairbanks-Morse Manufacturing Company) and, except during his military service, when he was lieutenant-colonel in the Signal Corps, he has been with the company continuously since that time. In the 36 years, he has been employed in various positions as salesman, department manager, branch house manager, sales manager, president of the manufacturing division, vice-president in charge of purchases, first vice-president, vice-chairman of the board and now president and general manager. Col. Morse is also a director of E. & T. Fairbanks & Co., the

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Canadian Fairbanks-Morse Co., Ltd., the E. & T. Fairbanks & Co., Ltd., and the Central Republic Bank and Trust Company.

A. G. BRYANT, general manager, machinery division, Joseph T. Ryerson & Son, Inc., has resigned and become president of the newly-organized Bryant Machinery & Engineering Company, Chicago Daily News Building, 400 W. Madison street, Chicago. Mr. Bryant was identified in various capacities with the Ryerson organization for 20 years and, for the past two years, was secretary and treasurer of the Associated Machine Tool Dealers. Bryant Machinery & Engineering Company has been organized to serve a group of machinery manufacturers as their consolidated sales department. For these companies, it will assume the responsibilities of sales engineering and management, advertising direction and general distribution for all territories. In some localities, it will function as dealer in selling to the trade; in other districts, representation will be given through appointed, exclusive machine tool dealers. It will thus act in the dual capacity of local dealer in certain territories and as general distributor, responsible for promotion of all sales for the various manufacturers. The scope of the business embraces high-grade machine tools, general metal-working machinery and special equipment as required in the various fields of industry and by railroads. The company will concentrate on the engineering and sales problems of a few lines such as multi-duty radial boring and drilling machines, manufactured by The Dreses Machine Tool Company; special-production and heavy-duty drills, built by the Green Bay Berker Machine & Tool Works; Kling Brothers Engineering Works' high-speed friction saws (formerly Ryerson) and the products of The Ohio Machine Tool Company, including standard and special railroad shapers, planers and horizontal boring, drilling and milling machines in floor, table and combination types. Special-purpose machinery and welding equipment, including electric arc, flash and spot welding machines and accessories, will also be important parts of the business. Others active in the management of the company are A. P. Schumann, formerly sales manager, machinery division, Joseph T. Ryerson & Son, Inc.; Ira B. Yates, formerly chief engineer, machinery division, Joseph T. Ryerson & Son, Inc., and M. J. Wiora, formerly office manager, machinery division, Joseph T. Ryerson & Son, Inc. Directors of the company are A. G. Bryant; G. A. Bryant, Jr., executive vice-president, The Austin Company; and E. B. Wilkinson of Gallagher, Rinaker, Wilkinson and Hall.

C. E. WILSON, general sales manager of the Worthington Pump & Machinery Corporation, has been appointed vice-president in charge of industrial relations with headquarters at New York. Mr. Wilson began work with the Worthington organization in 1899 as a salesman in the Chicago office. He subsequently served consecutively as sales manager of the Chicago office, assistant general sales manager in charge of all territory from Cleveland to Denver, assistant general sales manager in charge of foreign business, and, since 1923, as general sales manager. Clarence E. Searle, general representative in charge of sales of the Allis-Chalmers Manufacturing Company, has been appointed vice-president in charge of sales of the Worthington Pump & Machinery Cor-

C. E. Wilson

poration, with headquarters at Harrison, N. J. Mr. Searle has been associated with the Allis-Chalmers organization since 1908, serving first as sales representative in the Milwaukee office, then as district manager of that office, until 1915, when he was appointed general representative in charge of sales, which position he held until his present appointment. Prior to that service, Mr.

Clarence E. Searle

Searle was with the Western Electric Company and with the Fort Wayne Electric Works, (a division of the General Electric Company.)

C. L. MCMULLEN has been appointed manager of engine sales in the special sales division of the Caterpillar Tractor Company, Peoria, Ill.

President Farrell of U. S. Steel Corporation to Retire April 18

JAMES A. FARRELL, president of the United States Steel Corporation, has announced his intention to retire as president of the corporation on April 18 at the time of the annual meeting of the stockholders. Mr. Farrell has been president since January 11, 1911, and has been in the service of the corporation and its predecessor companies for upward of 50 years. It is Mr. Farrell's intention, upon his retirement from the presidency, to remain as a member of the board of directors.

Obituary

WILLIAM V. KELLEY, who resigned in 1912 as president of the American Steel Foundries, died at his home at Chicago, on January 21 of heart disease.

WILLIAM W. BLACKBURN, formerly from 1901 to 1927 vice-president and secretary of the Carnegie Steel Company, who retired from active business in 1927, died at Pittsburgh, Pa., on December 11.

DUTE BROWN, sales engineer at St. Louis, Mo., of the Southern Wheel Company, New York, died on January 18 in a hospital at St. Louis, at the age of 37. Mr. Brown had been in the employ of the Southern Wheel Company since 1918, and previous to that time had served with the American Car & Foundry Company at St. Louis.

W. F. RICHARDS, former mechanical superintendent of The Gould Coupler Company, and later consultant of the present Gould organization, died on January 4 at his home, Depew, N. Y., after a brief illness. Mr. Richards was born on October 14, 1857, at Albany, N. Y., and attended the public schools at Kent, Ohio. From 1873 to 1878 he served his apprenticeship in the car and locomotive departments of the New York, Pennsylvania & Ohio (now part of the Erie) shops at Kent and Galion, Ohio. From 1878 to 1882 he was in the mechanical departments of the Canadian Pacific, the New York, Pennsylvania & Ohio, the Erie and the Westinghouse Air Brake Company. In 1892 he became mechanical engineer and subsequently mechanical superintendent of the old Gould Coupler Company, in which capacity he was responsible for its truck side frame, bolster and journal box designs and primarily for the contribution which the Gould Company made to the development of automatic couplers for locomotives, passenger and freight train cars. Mr. Richards was for many years Gould's representative on the Engineers Coupler Committee which, with the advice and co-operation of the Master Car Builders' Committee on Couplers, developed the type D coupler. The adoption of this as standard by the American Railway Association eliminated the confusion previously resulting from a large number of individual designs of couplers with widely different parts and only imperfectly interchanging as a whole.

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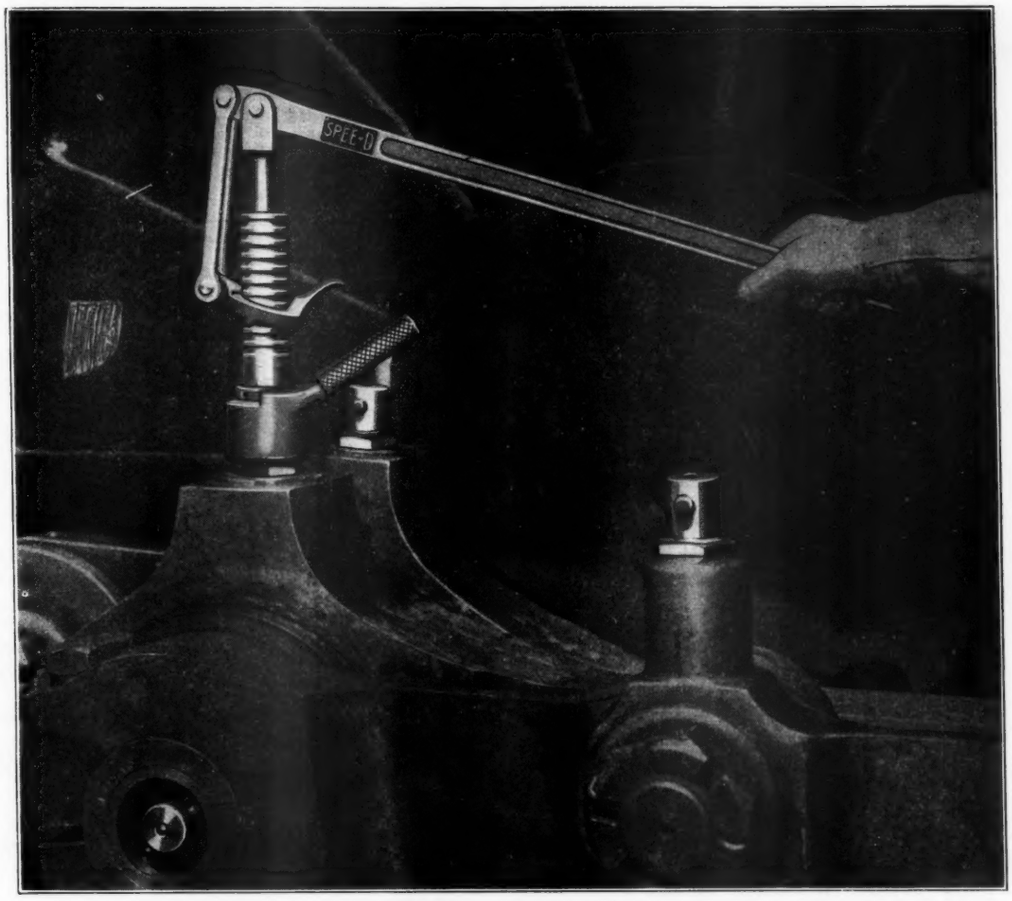


The "SPEE-D" Way

ONE engine preparer with a "SPEE-D" High Pressure Gun can easily lubricate a half a dozen rod bearings in the time required to remove one grease plug, fill the cup and replace the plug.

The savings in engine preparation costs alone will refund the investment inside of a year. One large engine terminal has reduced the cost of this operation $10,000 per annum.

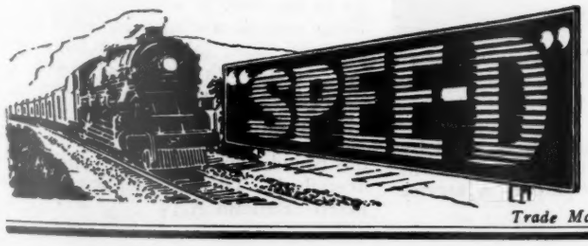
And don't forget that the "SPEE-D" way also insures more efficient lubrication, fewer failures due to hot pins or cut bushings, and a big reduction in rod bearing maintenance costs.

The "SPEE-D" way is now in use on 40 large railroads

RELIANCE MACHINE & STAMPING WORKS, Inc.
NEW ORLEANS, LA.

Agents and Representatives

H. C. MANCHESTER, 3712 Grand Central Terminal, New York City
Consolidated Equipment Company, Montreal
Mumford Medland, Ltd., Winnipeg
International Railway Supply Company, 30 Church St., New York City



Saves Time, Labor, Grease and Grease Plugs

Trade Mark Registered

Personal Mention

Master Mechanics and Road Foremen

THE JURISDICTION of E. F. Stroeh, master mechanic of the Missouri Pacific, with headquarters at Poplar Bluffs, Mo., has been changed to include the Missouri division of the Missouri Pacific and that part of the Missouri Illinois (unit of the Missouri Pacific) west of the Mississippi river, with headquarters at the same point.

Purchasing and Stores

N. FIEGEL, district storekeeper of the Southern Pacific at Houston, Tex., has been transferred to Algiers, La.

W. E. ROWSON has been appointed district storekeeper of the Southern Pacific, with headquarters at Houston, Tex.

WILLIAM MCMASTER, purchasing agent of the Chicago River & Indiana and the Indiana Harbor Belt, has moved his headquarters from Chicago to Gibson, Ind.

THE JURISDICTION of C. C. Warne, purchasing agent of the New York Central, at New York, has been extended over the Michigan Central and the Cleveland, Cincinnati, Chicago & St. Louis.

K. P. CHINN, trainmaster of the Houston division of the Southern Pacific Lines in Texas and Louisiana, has been promoted to the position of assistant general storekeeper, with headquarters at Houston, Tex.

H. C. PEARCE, who resigned on November 1, 1931, as director of purchases and stores of the Chesapeake & Ohio and the Pere Marquette, with headquarters at Cleveland, Ohio, has been appointed to the newly-created position of assistant to the general manager of the Chicago Great Western, in charge of materials and supplies, with headquarters at Oelwein, Iowa.

Trade Publications

Copies of trade publications described in the column can be obtained by writing to the manufacturers. State the name and number of the bulletin or catalog desired, when mentioned in the description.

OIL CUPS AND OILING DEVICES.—The Lunkenheimer Company, Cincinnati, Ohio, has issued a 16-page illustrated booklet descriptive of its various types of oil cups and oiling devices. Prices and leading dimensions are given.

FREIGHT-CAR CLEANING.—The J. B. Ford Sales Company, Wyandotte, Mich., describes in a recent folder the equipment and method employed in using Wyandotte metal cleaner for removing oil, grease, odors, etc., from refrigerator and box cars.

OPEN-HEARTH SHEET-STEEL PRODUCTS.—The new edition of the booklet "Inland Open-Hearth Sheet-Steel Products," issued by the Inland Steel Company, Chicago, contains up-to-date information on the ordering of steel sheets. Standard extra and differentials, sheet weights, and bundling tables, standard commercial tolerances and trade customs and practices are included, as well as concise description of Inland sheet-steel products.

LAVA for electrical and mechanical uses is described in a 24-page illustrated booklet issued by the American Lava Corporation, Chattanooga, Tenn. The lava is a natural material which can be machined and hardened, which is unaffected by acids or moisture, withstands high temperatures and which has a compressive strength of from twenty to thirty thousand pounds per square inch. Other molded and machined products made respectively of magnesium oxide and silicate of alumina are described.

DABEG BULLETIN.—Tabulated data, giving in particular tables of the characteristics of saturated and superheated steam compiled from recent scientific publications, are given in Dabeg Bulletin No. 1 issued by the Societe d'Exploitation des Procedes Dabeg, 4, Rue du General-Foy, Paris, France. Metric measures, as well as the English equivalents, are given in the tables.

ELESCO PRODUCTS.—Bulletin 2, containing an order list of parts for Elesco Type A superheaters; Bulletin H-3, containing an order list of parts for Elesco feedwater heaters, and Bulletin 12, containing an order list of parts for Elesco Type E superheaters, have been issued by the Superheater Company, 60 East Forty-Second street, New York. A number of important changes and additions over previous editions are contained in these bulletins. Detailed instructions on ordering parts are given, and charts, with identification numbers, show the locations of the various parts of the superheater and feedwater heater units.

WELDING AND CUTTING APPARATUS.—The Air Reduction Sales Company, 60 East Forty-Second street, New York, has issued a new catalog descriptive of Airco-Davis-Bournonville welding and cutting apparatus and supplies. The catalog, containing 26 pages, is of pocket size, indexed for ready reference. Specifications and prices are given on all types of welding and cutting torches, regulators, cylinder trucks and hose connections.

MULTIPLE THROTTLE.—Various important changes in the American multiple throttle are described in the new catalog, Bulletin 6, which has been issued by the American Throttle Company, 60 East Forty-second street, New York. The present standard throttle valves are described and illustrated, also the new standard camshaft bearing which has a thrust ball bearing on the outboard end. This ball bearing takes the thrust of the camshaft and acts as a support adjacent to the throttle operating arm. Numerous drawings are used throughout the catalog, one of especial interest being that of the throttle rigging with compensating lever which is now recommended.

COLD FINISHED BARS.—Because of the rapid development of cold finished bars within the last few years, Joseph T. Ryerson & Son, Inc., Chicago, has issued a bulletin describing the wide variety of shafting, screw stock, and open-hearth case-carburizing steels in use today. Everything from standard shafting to special accuracy stock is explained in a non-technical manner, describing what each is used for and why it serves certain purposes to the best advantage. A comprehensive range of products manufactured through the use of these various qualities are listed enabling the reader to refer readily to the steel in which he is interested. Shop records are also included to indicate the time, labor or money savings effected through the use of certain qualities. The last page is devoted to a list of standard manufacturing tolerances and S.A.E. specifications of the various round, square, hexagon and flat bars described. This publication is designated "Bulletin A."

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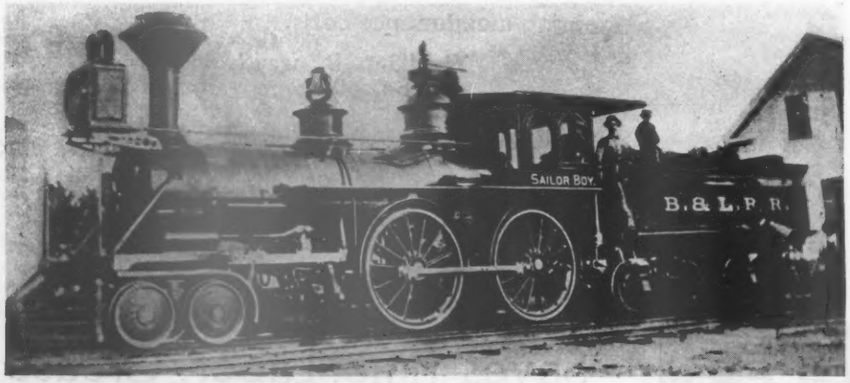

From Collection of George M. Sittig

Boston & Lowell 4-4-0 type locomotive No. 8—This engine was built in 1850 by Hinkley & Drury for the Salem & Lowell which was acquired by the B. & L. in 1858—The locomotive was built with inside connections and remained in service until 1882